LAW ENVIRONMENTAL

ENVIRONMENTAL ASSESSMENT FOR THE PAYLOAD SPIN TEST FACILITY REPLACEMENT (PSTF-R)

100% SUBMITTAL

Prepared For:

BRPH ARCHITECTS/ENGINEERS
Melbourne, Florida

Prepared By:

LAW ENVIRONMENTAL, INC.
Florida Operations Branch

Project Number 57-1726

January 1992

LAW ENVIRONMENTAL, INC.

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January 7, 1992

Mr. Lyler Houser
BRPH Architects/Engineers
3275 Suntree Boulevard
Melbourne, Florida 32940

Subject: 100% Environmental Assessment (EA) for the Payload Spin Test Facility Replacement (PSTF-R) at Kennedy Space Center (KSC)
Law Environmental Project Number 57-1726

Dear Mr. Houser:

Law Environmental, Inc. has completed the 100% EA for the PSTF-R at KSC. The project was authorized by your firm's acceptance of Law Environmental, Inc.'s Proposal Number 57-1425 (Revised) dated April 18, 1991. Subsequent revisions, to the scope of services were authorized by your firms acceptance of Law's July 18, 1991 amendment letter signed September 9, 1991, and additional work requested under TD-005 on November 1, 1991.

The enclosed document provides a summary of observations made during recent project activities and outlines the potential environmental concerns relating to the site.

This completes our submittal of deliverables for this project. If you have any questions or comments, please contact Steve Carney. It has been our pleasure working with you.

Sincerely,

LAW ENVIRONMENTAL, INC.

Stephen W. Carney mom
Stephen W. Carney
Senior Environmental Scientist

David J. Fall
Environmental Scientist

Thomas E. Lodge, Ph.D
Principal Environmental Scientist

Enclosures

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ABBREVIATIONS/ACRONYMS

CAA	Clean Air Act
CCAFS	Cape Canaveral Air Force Station
CWA	Clean Work Area
CZMA	Coastal Zone Management Act
DER	Department of Environmental Regulation
DOD	Department of Defense
EPA	Environmental Protection Agency
ERD	Environmental Resource Document
ERDAS	Earth Resources Data Analysis System
ESO	Endangered Species Office
FDS	Fire Deluge System
FEMA	Federal Emergency Management Agency
FGFWFC	Florida Game and Fresh Water Fish Commission
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GSE	Ground Support Equipment
HMF	Hypergol Maintenance Facility
HOSF	Hazardous Operations Support Facility
HPF	Hazardous Processing Facility
HVDS	Hazardous Vapor Detection System
IRIS	Italian Research Interim Stage
KMI	Kennedy Management Instruction
KSC	Kennedy Space Center
LAGEOS	Laser Geodynamic Satellite
LC-39	Launch Complex 39
MINWR	Merritt Island National Wildlife Refuge
MSSW	Management and Storage of Surface Water
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PHSF	Payload Hazardous Servicing Facility
PSD	Prevention-of-Significant-Deterioration
PSTF	Payload Spin Test Facility
PSTF-R	Payload Spin Test Facility Replacement
Q/D	Quantity/Distance
SCAPE	Self Contained Atmospheric Protection Ensembles
SCS	Soil Conservation Service
SJRWMD	St. Johns River Water Management District
SRB	Solid Rocket Booster
STS	Shuttle Transport System

TLV	Threshold Limit Value
USAF	United States Air Force
USFWS	United States Fish and Wildlife Service
VPF	Vertical Processing Facility

SECTION I

SUMMARY AND CONCLUSIONS

1.1 Summary

The proposed Payload Spin Test Facility-Replacement (PSTF-R) is intended to consolidate and relocate the existing payload spin test function into a dedicated facility. This change will allow National Aeronautics and Space Administration (NASA) personnel to achieve payload readiness for prescribed launch missions on a continuing basis without outside interferences brought about by other agency mandates.

To ensure personnel safety, Kennedy Space Center (KSC) is divided into three main geographical zones. The Industrial/Institutional areas are reserved for office buildings and other general institutional support facilities. The Launch Impact area, identified as the most likely impact area of a failed shuttle launch, is restricted to those facilities that directly support launches. The Hypergol Maintenance Facility (HMF) area is restricted to facilities that directly support the fueling and servicing of satellites. The PSTF-R must be located in the HMF operational area to minimize personnel injury in the event of a fueling accident. A detailed description of these geographical zones is available in the KSC Environmental Resource Document (ERD) 1986 Section 2.5 "Land Use, Management and Planning".

1.2 Project Alternatives

An evaluation of the project alternatives was undertaken to establish the most practicable solution to the current problem of conflicting mission requirements, scheduling difficulties and poor logistics at the currently shared PSTF. In keeping with NASA's responsibilities under the National Environmental Policy Act of 1969 (NEPA) as amended, four alternatives plus a No-Action Alternative were considered as possible for the PSTF-R (Figure 1 and Figure 2). Alternative A was field investigated and researched, while all other alternatives were researched without field verification.

A source of fill material will be required for the proposed PSTF-R. The entire project will require an estimated 32,000 cubic meters (42,000 cubic yards) of fill. Therefore, a borrow pit site was proposed and an environmental evaluation was conducted for the site (Appendix E). Alternatives for the borrow pit are the same as for the PSTF-R.

1.2.1 Alternative A (Preferred Alternative)

The preferred alternative places the PSTF-R between "D" and "E" Avenues, north of the existing Payload Hazardous Servicing Facility (PHSF). The facility will be positioned to minimize the impacts to wetlands. Access roads will connect with "E" Avenue and the PHSF. The site would be located close to the PHSF, which will aid in smooth operations and enhance safety. A dedicated ingress/egress route would be available in case of emergency

response activities. The Hazardous Operations Support Facility (HOSF), to be built as a part of the proposed action, will be located off the alternative and connected to the PHSF control building thus minimizing impacts.

Placement of the borrow pit at this site would cause extensive impacts to wetlands that would otherwise be minimized. A separate access road would be required from "E" Avenue.

1.2.2 Alternative B

This site is located north of the existing Vertical Processing Facility (VPF). The site lies adjacent to the existing borrow area and would require an access road connecting with 10th Street S.E. Nearly the entire area is composed of wetlands and is located a considerable distance (approximately 1 road-kilometer) from the PHSF, which conducts operations that will be closely linked to the PSTF-R. A dedicated route for emergency support would not be available unless the HOSF was also located on the alternative site.

Placement of the borrow pit at this site would cause even further impacts to wetlands than the PSTF-R, due to its size. A second access road connecting with 10th Street S. E. would be required.

1.2.3 Alternative C

This alternative is located southwest of the VPF. Access to the site would be via a roadway connection to 10th Street S.E. Nearly the entire area is composed of wetlands and is located a considerable distance from the

PHSF. It would lack a short, direct, and dedicated route for emergency support unless the HOSF was also located on this site.

Placement of the borrow pit at this site would cause even further impacts to wetlands than the PSTF-R, due to its size. An additional access road connecting with 10th Street S. E. would be required.

1.2.4 Alternative D

This site is located south of the PHSF and south of Ransom Road. The site would require an access road connecting with 10th Street or "E" Avenue S.E. for both borrow pit and PSTF-R. This site is located in good proximity to the PHSF. A dedicated emergency access route would not exist for this site thereby requiring the construction of the HOSF on site.

1.2.5 Alternative E (No-Action Alternative)

The No-Action Alternative would require NASA to continue sharing the existing Payload Spin Test Facility (PSTF) with the United States Air Force (USAF). No borrow pit would be required with this alternative.

1.3 Conclusions

Alternative B lies within the headwaters of Buck Creek and consists almost entirely of wetlands. Locating the PSTF-R or borrow pit at this site would cause excessive wetland impacts. Because of its connection to the Banana River, Buck Creek and its headwaters are considered "waters of the state". These waters are subject to federal, state, and regional regulations. The site lies within the 100-year floodplain and could be subject to frequent

flooding. Operational impacts for the PSTF-R due to the distance from the PHSF were considered to be great. This alternative was considered environmentally and operationally undesirable.

Alternative C was not considered a feasible alternative due to the presence of Buck Creek and surrounding wetlands. The resultant wetland impacts to this area are considered to be excessive. The site's distance from the PHSF also makes this alternative operationally impracticable for the PSTF-R.

Although Alternative D is logistically more desirable for the PSTF-R than B and C because it is closer to the PHSF, it presents several environmental problems. This entire area is managed by the United States Fish and Wildlife Service (USFWS). Using the area would require removing it from the Merritt Island National Wildlife Refuge (MINWR). The existence of borrow pits and several KSC wetland mitigation sites further complicates the placement of a facility here. Finally, the clear zones required around an eagle nest known to be in this area makes placement of this type of facility at this location untenable.

The overall construction impacts of the PSTF-R will likely be greater for Alternatives B, C, and D due to the possibility of constructing the HOSF nearby in a previously undeveloped area. Final acreages of impact due to the construction of the PSTF-R at these locations would depend upon final configurations but may exceed 5 hectares (12 acres) in some cases. The new

utility corridors required for Alternatives B, C, and D would open up these areas to more future development.

The No-Action Alternative (Alternative E) is considered unacceptable. Such an alternative will allow the perpetuation of conflicting mission requirements, scheduling difficulties, and poor logistics. These problems would only increase in the future as NASA and the Space Shuttle program expand.

The Proposed Action of constructing a NASA-dedicated PSTF-R near the KSC complex meets the requirements of NASA's future space program. Information gathered on the environmental impacts associated with the Preferred Alternative would support a Finding Of No Significant Impact (FONSI). Within the area of the proposed alternative, the building site will be located so that environmental perturbations are minimized. Construction will directly impact about 3 hectares (7.2 acres) of previously disturbed habitat. While construction of the borrow pit will impact approximately 11 hectares (27 acres), placement of the pit at the proposed location will impact limited wetlands and protected species. Implementation of the proposed action is not expected to significantly affect the long-term integrity of the existing environment in the vicinity of the project site, nor at KSC generally.

SECTION II

PURPOSE AND NEED

2.1 Purpose

The proposed action is to provide NASA a dedicated PSTF capable of handling current and projected launch missions. Such a facility will allow the separate pursuit of launch missions by both NASA and the Department of Defense (DOD) without the interference of exclusive use payload requirements. It is thought that the PSTF-R will result in smoother preparation and scheduling of launches, increased timeliness and energy efficiency due to its proximity to the KSC complex, and ultimately increased confidence and efficiency by the PSTF-R personnel responsible for meeting NASA's future space program mandate. There is presently no facility at KSC that meets this exclusive, NASA specific, requirement of readying these types of space payloads.

2.2 Need

The existing PSTF is located on Cape Canaveral Air Force Station (CCAFS) property nearly 16 road-kilometers (10 road-miles) from the KSC Industrial Complex, and is shared with the USAF (Figure 1). Current military payload requirements and launch schedules conflict with NASA's necessity to support specialty shuttle payloads such as the Laser Geodynamic Satellite (LAGEOS). With future space missions of a diversified and dynamic nature

increasing, counteracting mission requirements will lead to the proliferation of inefficient and conflicting facility utilization.

SECTION III

PROJECT DESCRIPTION

3.1 Proposed Action

The Payload Spin Test Facility - Replacement (PSTF-R) is the name of the processing facility proposed for construction in the southeast portion of the KSC Industrial Area near to the existing PHSF, which services payloads that utilize hypergols (hydrazine) as propellant. The PSTF-R, in conjunction with the PHSF, will be required to process certain generic payloads and Space Station Freedom payloads that are fueled with hypergolic propellants before being loaded into the launch vehicles. The PSTF-R will consist of the Hazardous Processing Facility (HPF) and the Hazardous Operations Support Facility (HOSF).

3.1.1 Hazardous Processing Facility (HPF)

The processing building will encompass approximately 4,200 square meters (15,000 square feet) and will require approximately 27,500 cubic meters (36,000 cubic yards) of fill. It will include a high bay, 18.3 by 41.5 meters (60 by 136 feet) with an uninterrupted length of 6.1 meters (20 feet), designated for storage. Rails for a 37-metric ton (36-ton) bridge crane will extend the full 41.5 meters (136 feet). The completed structure is proposed to have the following functional areas:

1. **High Bay**

A. **Service/Maintenance Area.** This area is the largest uninterrupted space and will be used for servicing, mechanical, and electrical testing of spacecraft and upper stage elements, and deservicing, cleaning, and purging of the on-board hypergolic systems. The Service/Maintenance area will contain fixed and movable platforms and access stands, sumps and drain(s) for accidental hypergolic fuel spills and a 37-metric ton bridge crane with a 15.2 meter (50-foot) hook height.

B. **Storage Area.** This extension of the high bay is intended for removal and short term storage of shipping covers or containers, temporary parking for moveable access stands and other Ground Support Equipment (GSE), and for the non-hazardous activities associated with processing a payload. This area will also be used to depressure flight modules upon return through the hazardous vent system.

2. **GSE Storage Area.** This room will provide a Level IV Clean Work Area (CWA) for the staging and temporary storage of ground support equipment. This room will serve as the equipment airlock for propulsion modules in the present facility concept.

3. **Hazardous Storage/Staging Area.** This area will require direct access into the GSE Storage Area with the provision of a vertical lift door. This room will be designed to achieve a Level IV CWA, and will require a 6.1 meter (20-foot) minimum ceiling height.

4. The remainder of the facility will be comprised of the Test Assembly Inspection Record station, clean room, garment change area, flight hardware storage, technician lockers and breakroom, communication room, and flight data communication room.

3.1.2 Hazardous Operations Support Facility (HOSF)

This building (to be attached to the north wall of the PHSF in the Preferred Alternative) will contain the areas and offices required to enable the hazardous operations at the HPF. The HOSF will require approximately 4,500 cubic meters (6,000 cubic yards) of fill. The minimum occupancy for the HOSF will be 100 people. The HOSF will also be designed for handicapped accessibility.

Planning for this building will prioritize construction in the following general order without penalizing future additions: Facility Control Room, Office Space, Self Contained Atmospheric Protection Ensembles (SCAPE) Change Area, Operations Controls Rooms, PCS Support Area, Communication Room, Material Service Center, Technician's Break Room,

Conference Room, Soft Goods Laboratory, Non-Contaminated Storage, and Miscellaneous Support Areas.

3.2 Alternatives

Descriptions of alternatives apply to both the PSTF-R and the borrow pit except where noted.

3.2.1 Alternative A (Preferred Alternative)

The general area selected for the proposed complex is already zoned for this occupancy, is served by a suitable Class C traffic artery, and may be adequately supplied with 60 Hz power and potable water. The initial phase of this project will include the construction PSTF-R, paved roads and parking, extensions of existing utilities, on-site containment of storm water and toxic liquids, fencing, and other security elements.

The facility will be constructed over an area of 3 hectares (7.2 acres). The preferred alternative site location and configuration are depicted in Figure 3. Explosive and toxic vapor quantity/distance (Q/D) separation requirements establish separations within the new complex (213.3 meters or 700 feet) and between adjacent facilities, roads, and differently zoned properties (365.8 meters or 1,200 feet). Of the more than 56 hectares (139 acres) set aside for the project due to the Q/D requirements, only 3 hectares (5%) will be impacted due to the construction of the building, the grounds, and roads. The facility will provide the capability of handling, transferring and servicing/deservicing 24,948 kilograms (55,000 pounds) of hydrazine, the

maximum on site. However, normal operations will entail the transfer of approximately 3,040 kilograms (6,700 pounds). The complex will be linked to the KSC Industrial Area and Launch Complex 39 (LC-39) facilities, certain installations at the CCAFS, and other off-site locations to be determined through direct line-of-sight radiation to and from parabolic antennas mounted on the PSTF-R roof.

"E" Avenue, immediately east of the site, provides a logical and ready main access between the NASA Causeway and the payload facilities in the Industrial Area. More importantly a direct north-south link will be provided between the PSTF-R and the HOSF where support and emergency services will be provided. Roads to and within the site will be two lane, 7.3 meter (24 feet) wide with an interior corner radius of at least 15 meters (50 feet). Single lane roads, to be employed only for directional traffic control will be 4.9 meters (16 feet) wide. A utility corridor and dirt road running from the HOSF will be 4.3 meters (14 feet) wide.

3.2.2 Alternative B

Alternative B is north of the VPF. Access to the site would require a road extending to 10th Street S.E.. The surrounding wetlands would require the use of a large amount of fill to raise the existing grade above floodplain to a suitable level for the facility and roadways. Locating the HOSF on site would increase the impacts.

The following attributes were considered during analysis of the viability of this alternative: 1) degree of wetlands impacts, 2) possibility of protected species impacts, and 3) proximity to the PHSF. Virtually the entire footprint at this alternative would impact wetlands that are classified as "waters of the state". Permitting and mitigation requirements for this alternative would probably be extensive. Due to the open extensive wetlands, it is expected that a number of protected species may use this marshy area. Because it is located in the 100-year floodplain, frequent flooding at the area can occur. The distance from the PHSF would put a constant strain on operations at this alternative. This site represents excessive environmental and operational impacts.

3.2.3 Alternative C

Alternative C is south and west of the VPF. Access to the site would require a road extending north to 10th Street S.E. A large amount of fill would be required to develop this alternative for the PSTF-R. Locating the HOSF on site would increase the impacts.

Prior to the selection of an alternative, the following attributes were considered: 1) degree of wetlands impacts; 2) possibility of protected species impacts, and 3) proximity to the PHSF. As with Alternative B, this alternative would greatly impact wetlands that are classified as "waters of the state". The possibility of the presence of several protected species exists and

flooding is possible. This site is also a considerable distance from the PHSF. The site represents excessive environmental and operational impacts.

3.2.4 Alternative D

Alternative D is south of the PHSF and south of Ransom Road. Site access could be made directly to "E" Avenue S.E. This entire area is on land managed by the USFWS. Using this area would require removing it from the MINWR. Locating the HOSF on site would increase the impacts.

Prior to the selection of an alternative, the following attributes were considered: 1) degree of wetlands impacts, 2) possibility of protected species impact, and 3) proximity to the PHSF. Although this area is closer to the PHSF, it presents several environmental problems. Borrow pits comprise much of the site and KSC wetland mitigation areas would surely be impacted. Protected species potentially impacted include the bald eagle (*Haliaeetus leucocephalus*). A bald eagle nest is known to be located south of this alternative and its required clear zone would overlap the site. The presence of the nesting clear zone, the borrow pits, and the wetlands make placement of the PSTF-R here extremely difficult. This site represents the most excessive environmental impacts of the alternatives considered.

3.2.5 Alternative E (No-Action Alternative)

The No-Action Alternative is not a viable alternative compatible with KSC's mission directives, namely the future space program and its attendant requirements for specialty shuttle payloads (e.g., LAGEOS) precludes the use of the existing PSTF-R.

The PSTF now exists some 16 road-kilometers (10 road-miles) away at the CCAFS, which has become shared with the military. The USAF has increased demands on the PSTF in readying its vehicle payloads for launch. The current configuration of the spin balance machine and the remainder of the facility meets the requirements of the USAF's existing launch needs. However, the existing configuration and the USAF's usage conflicts with NASA's plans to install a spin balance machine with the requisite sensitivity to process and support the LAGEOS payload. Additionally, due to the DOD's unique payload requirements and security considerations, multiple use of this single facility by two governmental agencies with increasingly disparate mission requirements, makes maximizing use of the existing PSTF untenable. A continuation of this condition through the No-Action Alternative will perpetuate and magnify the conditions of inefficient and conflicting facility utilization.

Additional considerations were given to the practicability of having the USAF construct it's own facility and allowing NASA exclusive use of the existing facility. However, this option would also entail environmental impacts

due to construction and would, overall, be less justifiable from the standpoint of operational efficiencies, logistics, and energy conservation due to the distance between the PSTF and other KSC support facilities. As a result, this secondary option does not represent a viable solution.

The No Action Alternative represents non-optimal land and facility utilization for the mission objectives of two agencies.

SECTION IV

DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 General

Kennedy Space Center (KSC) is located on Merritt Island on the east coast of Florida. It is bound by two brackish water lagoons on the east and west. A detailed description of the KSC environment is available in the ERD.

The following sections provide more detailed information on the proposed action environmental effects. Each of the alternative site locations are in the general area of the intersection of "E" Avenue S.E. and 10th Street S.E. in the KSC HMF Area (see Figures 1 and 2). The general configuration of the proposed action in the preferred alternative is shown in Figure 3. The footprint and access roads as depicted for the preferred alternative would encompass approximately 3 hectares (7.5 acres).

4.2 Air Quality

The Clear Air Act (CAA), passed by the U.S. Congress in 1967, provided authority to establish air quality standards. The CAA has been amended several times with the most recent amendment being the CAA amendments of 1990. The 1990 amendments to the CAA strengthens air quality control agencies and adds new regulatory requirements, some of which will take ten or more years to put fully into effect. These revisions have included Prevention-of-Significant-Deterioration (PSD), changes in certain

sampling requirements, mobile sources, air toxics, ozone depleting chemicals, etc. The Environmental Protection Agency (EPA) is the federal agency primarily responsible for implementing and administering the CAA, and has delegated state authority to the Florida Department of Environmental Regulation (DER).

Air quality at KSC is considered good. It is currently an attainment area for all regulated air pollutants. The major sources of air pollution at KSC are motor vehicles, Space Shuttle launches, heating plants, and the Solid Rocket Booster (SRB) Assembly and Sub-assembly Facility operations. The effects of motor vehicles are measurable only during rush hours. The effects of the Shuttle launch occur only immediately after launches and are short-lived. The heating plant produces sulfur dioxide (SO_2), while the SRB facility emits volatile organic compounds. Each of those emissions, is less than 254 metric tons/year (250 tons/year), which is the level that mandates a PSD review. Consequently, these emissions are not considered significant (see ERD Section 3.2 "Air Quality") . Air quality specific to the construction of and operation at the new facilities is addressed in Section 5.2.1 of this document.

4.3 Ecological Description

4.3.1 Alternative A (Preferred Alternative)

The majority of habitats present on the Preferred Alternative site have been previously impacted by, if not created as a result of, either clearing or dredging activities that took place prior to 1962. The native vegetation had been cleared for the purpose of growing citrus, while ditches were created to assist in draining the site for this agricultural activity. These ditches now provide stormwater conveyance for a number of KSC facilities, particularly the Parachute Refurbishing Facility to the north. Felda and Winder soils, a wetlands indicator, (see Figure 4), historically represented 50 to 70 percent of this site. However, recent soil samples indicate most of the existing area (with the exception of the ditches) to be non-hydric in character.

There were generally three communities that dominate the preferred alternative. The first and most dominant, based on areal coverage, was a disturbed successional shrub community dominated by wild grape (*Vitis rotundifolia*) with some scattered slash pine (*Pinus elliottii*) and pepper vine (*Ampelopsis arborea*). The soils of this habitat were field identified as non-hydric.

Drainage ditches traverse the project site in diagonal lines northeast to southwest at regular intervals. These ditches made up the second community type and averaged approximately 2.5 to 3 meters (8 to 10 feet) across at the water surface with steep banks, sloped at a ratio of greater than

3:1, and rising several feet above the water's surface. The banks were typically vegetated by willow (*Salix caroliniana*), wax myrtle (*Myrica cerifera*), and salt bush (*Baccharis* sp.). A few large specimens of red maple (*Acer rubrum*) and elderberry (*Sambucus canadensis*) were also found in limited association with the ditches. Wild grape continued to be present in these areas as well as the exotic pest, Brazilian pepper (*Schinus terebinthifolius*). Within the ditches, at limited locations, were some stands of arrowhead (*Sagittaria latifolia*). The ditch bottoms and lower portions of the banks were underlain by hydric soils (field verified).

Remnant hardwood hammocks comprised the third type of habitat found at the project site. These hammocks were typified by moderately large oaks (*Quercus virginiana* var. *geminata*, *Q. chapmanii*; *Q. myrtifolia*) forming the canopy, with a variety of ferns, poison ivy (*Toxicodendron radicans*), virginia creeper (*Parthenocissus quinquebolia*) and some scattered saw palmetto (*Serenoa repens*) present in the understory.

In September, 1991 NASA Biomedical office conducted a Biological Assessment of the PSTF-R Alternative A (PSTF-R BA) for the USFWS, which provided a detailed description of this site. In addition, Earth Resources Data Analysis System (ERDAS) maps were consulted. These maps appeared to be outdated and showed Alternative A as containing mostly slash pine flatwoods.

4.3.2 Alternative B

As the headwaters for Buck Creek, this area consisted almost entirely of wetlands. The typical soil association according to the Soil Conservation Service (SCS) for this area is Immokalee Sand with some Felda-Winder and submerged marsh soils. The area plays an important role in the local marine and terrestrial ecosystems. Buck Creek and its headwaters are considered "waters of the state" because of their connection to the Banana River. These waters are subject to federal, state, and regional regulations.

4.3.3 Alternative C

This alternative site consists of Buck Creek and its adjacent wetlands. According to the SCS, the typical soil association for this area is submerged marsh and Immokalee sand. These "waters of the state" afford valuable habitat for many aquatic species, some of which may be protected.

4.3.4 Alternative D

This alternative site is located on land managed by the USFWS. It consists of borrow pits, and several KSC wetland mitigation areas. Typical soil associations mapped by the SCS are Felda-Winder soils and Immokalee sand. Located just to the south is a bald eagle nest. The required clear zone around the nest as established by the USFWS and the NASA Master Plan encroaches this alternative.

4.4 Protected Species

Protected plant and animal species known to occur at KSC are identified and discussed in Appendix C and D of the ERD. Of the fauna listed in the ERD, only six protected species are likely to occur in the habitats present at the various alternative sites, and are discussed below. The bald eagle was known to effect the consideration of Alternative D, while the remaining species were considered possibly to be present on Alternative A.

Scientific Name	Common Name	USFWS	FGFWFC
Aphelocoma coerulescens coerulescens	Florida scrub jay	T	T
Haliaeetus leucocephalus	Bald eagle	E	T
Drymarchon corais couperi	Eastern indigo snake	T	T
Gopherus polyphemus	Gopher tortoise	C2	SSC
Rana areolata	Gopher frog	C2	SSC
Podomys floridanus	Florida mouse	C2	SSC

USFWS = United States Fish and Wildlife Service.

FGFWFC = Florida Game and Fresh Water Fish Commission.

T = Threatened; SSC = Species of Special Concern;
C2 = Candidate for listing with some evidence of vulnerability, but for which not enough data exist to support listing.

4.4.1 Florida Scrub Jay (*Aphelocoma coerulescens coerulescens*)

While the Florida scrub jay is known to prefer the habitat afforded by xeric scrub oak communities, it has been observed in association with interdunal swales and pine flatwoods, and is considered common over most of Merritt Island's upland areas. It was concluded that the preferred alternative represents marginal habitat to the species, although at least one individual was observed on two occasions in the vicinity of the northeast

corner of the project site. The PSTF-R BA located one scrub jay nest and estimated that 1-3 individuals occur on site. Alternatives B, C, and D are not likely to contain scrub jay habitat primarily due to their wetland characteristics.

4.4.2 Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is generally associated with lakes, rivers, and shallow coastal areas, particularly during their nesting season, because they depend extensively on fish as their food source. Nesting and roosting usually occurs in tall living or dead trees that offer the eagle a wide view of the surroundings. Nesting activity typically occurs between October 1 and May 15. Eagles are most vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding. This is roughly the first 12 weeks of the nesting cycle. As a result, the USFWS established primary and secondary management zones surrounding the nests. The primary zone is the most critical area immediately around the nest and must be maintained to promote optimum conditions for the eagles. In general no major activities should occur in the secondary zone during the nesting period. NASA has established a clearance zone of 805 meters (2640 feet) around nesting areas, offering a substantial buffer zone beyond that recommended by USFWS.

The presence of a bald eagle nest affects only Alternative D. The clearance zone for the bald eagle nest known to exist south of this alternative extends well into this site (Figure 2).

4.4.3 Eastern Indigo Snake (*Drymarchon corais couperi*)

The eastern indigo snake occurs on both the federal and state protection lists and may occur in the preferred alternative. Evidence indicates that federal protection has substantially reduced collection pressure on this species. This species is apparently tolerant of a variety of habitats: pine flatwoods, moist tropical hammocks and, more typically, sandhill and sand pine scrub communities. The indigo snake is one of many species known to utilize the burrow of the gopher tortoise for shelter. Indigo snakes have been documented as occurring in nearly every available habitat at KSC. While gopher tortoises burrows were noted on site, no indigo snakes were observed during the field visits.

The PSTF-R BA conservatively estimated that two individuals may inhabit Alternative A, but none were sighted. Alternatives B, C, and D are believed to be too inundated with water to afford much habitat for the indigo snake.

4.4.4 Gopher Tortoise (*Gopherus polyphemus*)

The gopher tortoise constructs burrows in the dry sandy soils typically characterized by long leaf pine, live oak hammock, and sand pine scrub communities, and is a common resident of xeric scrub and fallow, disturbed habitats at KSC. The habitat typifying Alternative A can be characterized as fallow and disturbed. During field visits to Alternative A four active and one inactive gopher tortoise burrows were noted in the limits of the HPF and

access roads. Two abandoned burrows were located in the area of the Alternative A HOSF utility corridor. Gopher tortoise density calculations were conducted using a conversion factor of 0.614 (Cox *et al.*, 1987). For the Alternative A project footprint a density of 1.06 gopher tortoises per hectare (0.43 gopher tortoises per acre) was calculated. Alternatives B, C, and D are believed to be too wet to afford suitable gopher tortoise habitat.

Field visits to the proposed borrow pit site resulted in locating 5 inactive and 1 abandoned burrow (Appendix E). The proposed borrow pit BA reported the location of 6 active and 3 inactive burrows (Appendix F). This site, therefore, affords some gopher tortoise habitat.

4.4.5 Gopher Frog (*Rana areolata*)

The Florida gopher frog makes use of dry, well-drained soils typical of sandhill communities and sand pine scrub habitats. This amphibian commonly uses the burrows of the gopher tortoise as refugia. Grassy ponds are the principle habitat used by the Florida gopher frog for reproduction. Although this species was not sighted during the field visits, the presence of gopher tortoise burrows as well as the grassy ditches throughout the site would indicate that this species may occur at the Preferred Alternative. Its presence in Alternative B, C, and D is possible.

4.4.6 Florida Mouse (*Podomys floridanus*)

The Florida mouse is entirely restricted to Florida. Sand pine scrub in early successional stages is its primary habitat, but it can be found in a number of habitats characteristic of xeric conditions. Sandy well-drained soils are a requisite for this burrow dweller. The Florida mouse, like many species, is known to utilize the burrow of the gopher tortoise for refuge. Pine flatwoods and scrub, as well as much of the ruderal area throughout KSC, are known to harbor this species. Although this species was not sighted during field efforts, the presence of gopher tortoise burrows and sandy well-drained soil would indicate that this species may occur in the Preferred Alternative. The apparent absence of well-drained soils required for its borrows make it unlikely that this species inhabits Alternative B, C, or D.

4.4.7 Incidental Protected Species

A number of other protected species (particularly birds) that use habitats peripheral to the site might, on occasion, be observed as an episodic or passing visitor. During one site visit, 30 wood storks (*Mycteria americana*), three limpkins (*Aramas guarauna*) and two snowy egrets (*Egretta thula*) were observed at the east edge of the Preferred Alternative within the stormwater ditch that runs parallel to "E" Avenue. These occurrences were considered and dismissed as not requiring the subject site for habitat. These species are listed and described in further detail in Appendix C of the ERD.

4.4.8 Protected Flora

Although a detailed survey of protected flora that may occur at the project site has not been undertaken, past extensive clearing and drainage activities have resulted in domination by disturbed, secondary vegetation that has precluded established communities of the protected Florida native species. A list of selected protected plant species that might be found in marginal isolated communities in Alternative A was compiled from Appendix D of the ERD and is provided below. A more detailed description of the Preferred Alternative vegetation can be found in the PSTF-R BA.

PROTECTED FLORA

Scientific Name	Common Name	Designated Status USFWS	FDA
Calamovilfa curtissii	Curtiss' reedgrass	C2	E
Cereus eriophorus var. *fragrans*	Fragrant wool-bearing cereus	E	E
Cereus gracilis	West Coast Prickly-apple	C2	E
Conradina grandiflora	Large-flowered rosemary	C2	E
Lechea cernua	Nodding pinweed	C2	E
Verbena maritima	Coastal vervain	C2	E
Verbena tampensis	Tampa vervain	C1	E

USFWS = United States Fish and Wildlife Service: List of Endangered and Threatened Wildlife and Plants, 50 CFR 17.12 (official United States List).

FDA = Florida Department of Agriculture and Consumer Services: Preservation of Native Flora of Florida Act, Section 581.185, Florida Statutes (official State of Florida list).

E = Endangered; C1 = A candidate for federal listing, with enough substantial information on biological vulnerability and threats to support proposals for listings; C2 = A candidate for listing, with some evidence of vulnerability, but for which not enough data exist to support listing.

SECTION V

ENVIRONMENTAL EFFECTS

5.1 Comparative Evaluation

The environmental impact on the Preferred Alternative will be minimal. Approximately 3 hectares (7.5 acres) of an historically disturbed habitat will be eliminated from the preferred alternative location. However, much of this habitat surrounding the proposed structures (about 56 hectares or 139 acres) will remain relatively unimpacted to fulfill the facilities Q/D clear area requirements. Weighing the benefits of the increased efficiency, and the increased capabilities of NASA's (and USAF's) future space program against the now conflicting operations, the overall impact is considered insignificant. Individual assessments of anticipated potential environmental impacts imposed by the construction and operation of the proposed facility are presented in more detail in the following subdivisions of this section. Where possible, planned mitigation measures have been incorporated into the facility design and operation. Permitting requirements are mentioned where applicable, but final statements and actions cannot by made until NASA completes its early consultation with USFWS, Department of Environmental Regulation (DER), Florida Game and Fresh Water Fish Commission (FGFWFC), and St. Johns River Water Management District (SJRWMD) (see Appendices B and D). Advertisement and contract award for the

construction of the facility by NASA will not occur until all permit requirements have been met.

The No-Action alternative would not immediately impact the environment at KSC. However, differences in satellite types and conflicting schedules between NASA and the USAF will exacerbate the problem of multiple use of a single facility. The existing facility will not accommodate the continued increase and modernization of the differing space mission requirements. Since this is not an acceptable or reasonable alternative from the standpoint of KSC and national objectives, no further consideration of this alternative is justified.

5.2 Environmental Impacts of Proposed Action

Except where specifically addressed, the environmental considerations examined below apply equally to the all site alternatives.

5.2.1 Air Quality

a. Construction. Construction activities will produce equipment emissions and elevated dust levels. The amount of construction emissions and dust levels will vary with the amount of clearing and filling required, and will be influenced by the type of ground cover and method of debris disposal. Only the vegetation within the immediate footprint of construction will be cleared and grubbed. Open burning of the windrowed vegetation in accordance with the provisions of Chapter 17-256

F.A.C. is the required KSC method of disposal. Air permitting will be required by the DER for the construction of this facility as it is an air pollution source. A permit application is currently being prepared. No significant impact to air quality due to construction is expected. Alternative E would not impact the air quality.

b. **Operation.** Emissions generated from the propellants utilized in the PSTF-R fueling operations will be routed to the vapor scrubbers, which will remain operational during all fueling and spill control operations. The facility will be permitted in compliance with Florida Department of Environmental Regulation, Chapter 17-2.210, F.A.C. for volatile organic compounds emissions. The 1990 CAA amendments classify hydrazine as a hazardous air pollutant and these rule changes may come into effect at any time. Compounds classified as hazardous air pollutants are under stricter regulatory control and each individual compound in this class is given a specific National Emission Standard. Operational emissions are expected to be similar to current background emissions of the existing PSTF activities at CCAFS. Contingencies for sudden and catastrophic releases or explosions are designed into the facility, primarily through the safety provided by the Q/D

factor. The Q/D factors in combination with the use of vapor scrubbers, will provide protection to the immediate air quality. Therefore, no significant impacts to the environments at KSC are expected.

5.2.2 Surface Water

a. Construction. The proposed construction activity will alter the existing grade in the immediate footprint of the building, parking areas, and roads. It is estimated that about 3 hectares (7.5 acres) of land will be filled to a uniform elevation and sloped to shed storm water to the dentention areas.

In the case of the Preferred Alternative, an existing drainage ditch running through the center of the site must be re-routed and culverts placed. Similarly, culverts will be required for an existing drainage ditch to the east for the construction of the access road connecting the site to "E" Avenue, to the south for the combined emergency access road and for the utility corridor that will extend north from the HOSF. Environmental impact from the ditch reconstruction is not considered substantial.

The Parachute Refurbishment Facility located north of the Preferred Alternative holds an industrial wastewater permit for discharge into the canal that flows through the site.

However, while this ditch will be slightly altered, the integrity of the existing drainage system will be maintained.

The requirements under SJRWMD rule 40C-42 (Stormwater Discharge) must be met, but the permitting will be handled under their General Isolated Wetland Permit (Section 5.2.13). Because the limits of construction exceed 2 hectares (5 acres), the new proposed National Pollutant Discharge Elimination System (NPDES) Stormwater Rule (40 CFR 122) will require an application for a Stormwater Construction Permit be filed 90 days prior to the initiation of construction activity. Enactment of this rule will occur on October 1, 1991. During project construction, potential temporary increases in turbidity will be controlled by "Best Management Practices," and techniques employing turbidity curtains as specified by Florida Dredge and Fill Permit general conditions. These permit conditions will be incorporated into the construction contract. Thus, construction impacts to water quality are expected to be minimal, localized, and short term.

b. **Operation.** No point source impact to surface water (i.e., ditches) is expected from the operation of this facility. An NPDES Stormwater Operations Permit will be required. The runoff from the first one inch of rainfall or the first one-half

inch of runoff will be detained and treated through the employment of on-site stormwater ponds and swales as required by Rule 17-25 F.A.C.

5.2.3 Ground Water

a. **Construction.** Although equipment oil leaks may occur, they are normally small and isolated. In the event of a construction hydrocarbon spill, the KSC standard construction contract requires compliance with Kennedy Management Instruction (KMI) 1710.6B "Containment, Decontamination, Neutralization, and Cleanup of Hazardous Substances/Waste Spills", which is designed to preclude hydrocarbon contamination. The general flow pattern of the surficial aquifer, which is between 0.5 to 1.5 meters (2.0 and 4.0 feet) below ground surface at the Preferred Alternative, is not expected to be altered by the site preparation.

b. **Operation.** To protect both surface and ground water, the facility will be provided with an emergency spill containment system for the accidental spills of hypergolic fuels. Hazardous fluids will drain by gravity to a 19,000 liter (5,000-gallon) underground holding tank outside the facility. In the event of a spill, water hoses will be used to direct the fuel to the floor drains and subsequently to the holding tank. If a major fire

occurs, the Fire Deluge System (FDS) will be activated, otherwise fires will be handled with fire extinguishers. This system is available for emergency spills only. Should spilled hypergols become accumulated in the holding tank, the waste will be pumped as soon as practicable to mobile waste storage units for final transport and disposal.

It is anticipated that the designed spill containment system will provide adequate protection to the local groundwater, and thus, not cause a significant impact.

5.2.4 Toxic Substances

a. **Construction.** Standard construction contract precludes the use of toxic substances (See the KMI 1710.6B). No impact is expected during this phase.

b. **Operation.** Hydrazine, which is toxic, will be routinely handled at this facility. However, GSE such as liquid separators and vapor scrubbers will maintain the indoor air quality at acceptable levels. A hazardous vapor detection system (HVDS) will continuously monitor accumulations of hydrazine in the work environment. The HVDS will have an alarm at the Threshold Limit Value (TLV) for hydrazine. In March, 1991, the TLV for hydrazine was 100 parts per billion (ppb) or best available technology. Alarms from the monitors

will be routed to an Alarm Controller located in the Personnel Access Control Area.

The handling of liquid propellants receives particularly close supervision. Not only are the technicians constantly observed, but safety perimeters are installed to exclude unauthorized persons from the danger zone. All propellant storage areas are prominently identified and the appropriate restrictions are posted. Should exceedances be monitored, protective clothing, SCAPEs, and breathing air will be readily available and designed to allow workers safe egress.

As a contingency for catastrophic, unplanned events, such as an explosion or a major release of toxic fumes, clear zones have been established [214 meters (700 feet) for support, and 366 meters (1,200 feet) for non-related activities], thereby assuring the safety of the non-involved public.

Waste hypergol will be entrained and separated from the vapor, and collected in the accumulator section of the liquid separator (GSE). The accumulated liquid will be pumped to waste fuel storage for later disposal. Scrubbing liquid (liquor) from the vapor scrubber is recirculated until pH levels fall below a usable level at which time it is changed and disposed. Following the provisions and protocol already established at

KSC for waste handling (KHB 8800.7 "Hazardous Waste Management") and for the implementation of SARA Title III requirements (KMI 1800.2A "Chemical Hazard Communication Program"), and based upon the standard of care designed into the facility, impacts to the environment will not be significant.

5.2.5 Waste

a. **Construction.** Solid waste will be produced from the clearing and grubbing of the existing habitat. Most of this material will be windrowed and burned (See Section 5.2.1). All other general waste generated during the construction of the facility will be transported to the NASA Schwartz Road landfill for disposal. Only inert/nonhazardous waste will be generated during this phase. Therefore, no impact from construction generated wastes is expected.

b. **Operation.** Non-hazardous solid waste generated during operations will be temporarily staged on site for pick-up and disposed at the Schwartz Road landfill, or recycled as appropriate. No impact from non-hazardous wastes is expected.

5.2.6 Noise

a. **Construction.** Temporary generation of noise will result from construction machinery operation and added vehicular traffic. Normally, noise levels on the traffic access routes during periods of heavy flow are rated at about 65 to 70 dBA, measured at 30 meters (100 feet) from the traffic artery. During past periods of construction, the use of heavy equipment such as dump trucks, bulldozers, draglines, and earthmovers produced noise levels as high as 95 to 101 dBA (see ERD Section 3.3 "Noise"). Such short-term and episodic increases in the noise level will be insignificant relative to other noise levels produced on a daily basis at KSC. Thus, they will not produce a significant environmental impact.

b. **Operation.** The noise levels anticipated for the scheduled activities at the PSTF-R are expected to fall within the range of the existing background noise for current KSC operations. Observations at KSC (See ERD Section 3.3.2.6 "Environmental Impacts of Noise") indicate that wildlife in the area do not appear to be affected by noise generated by NASA operations. Based on past operations at the KSC and the incorporation of the proposed clear zone, no substantial impact has been

identified that will affect the local human or wildlife populations.

5.2.7 Accidents and Human Health

a. **Construction.** Potentials for construction accidents are recognized by the construction industry, by NASA, and by the regulatory government agencies. Every attempt has been made to minimize these potentials by safety stipulations in all government contracts, and by federal and local laws and regulations. KSC safety and construction inspectors who regularly inspect the work place to insure compliance with Occupational Safety and Health Administration (OSHA) and KSC safety regulations. The standard construction contract requires a contractors safety plan be approved by NASA/KSC safety office. Worker Safety and construction control is outlined in the "KSC Acquisition Guidebook". This activity will not involve any unusually hazardous materials or construction activities.

b. **Operation.** Some of the activities will involve standard industrial practice, but many of the PSTF-R activities involve highly specialized or unique processes requiring working with toxics, explosives, and overhead cranes. However, all operations classified as "hazardous" represent a potential threat

to human health and welfare undergo rigorous scrutiny and control. Equipment design, procedural controls, training, certification, and operational safety practices serve to reduce the risks to the work force.

While these practices are in effect at the existing PSTF, the PSTF-R will provide a positive impact to this important environmental parameter. The new complex will offer NASA a facility equipped with state-of-the-art technologies dedicated to NASA launch missions, eliminating multiple-use competition for a limited operational resource.

5.2.8 Natural Ecology

a. Construction. The construction of the proposed complex at Alternative A would cover an area of approximately 3 hectares (7.5 acres). The majority of the habitat of the preferred alternative to be directly impacted by the construction would be disturbed land dominated by successional plant growth. Although the area has some habitat value, the level of disturbance and monoculture dominance by the wild grape (*Vitis rotundifolia*) greatly reduces the area's capacity to support diverse populations of fauna and flora. Large areas, made up of similar habitats, are contiguous with the site and will be preserved as the required Q/D clear zones are enforced. It is

expected that fauna utilizing Alternative A will readily find suitable habitat in the surrounding area.

Alternatives B, C, and D would create additional impacts to the natural ecology. Each of these alternatives is located in wetlands and, due to the additional construction for the HOSF and utilities emplacement, these alternatives could impact in excess of 5 hectares (12 acres) of previously undisturbed habitat. Alternative E would result in no impacts.

b. **Operation.** The operational functions to be carried out at the facility are not expected to have any long term negative environmental impacts on the flora or fauna occupying the surrounding area.

5.2.9 Land Use and Quality

a. **Construction.** In the case of Alternative A, the transfer of this relatively small parcel of mostly disturbed habitat for the purpose of the PSTF-R represents an insignificant reduction of the undeveloped land currently available at KSC. With the exception of the total area to be filled for the access road and facility buildings, the overall topography and drainage of the site will be little affected. Much of the surrounding area will remain untouched due to the necessary clear zones. The

alteration of the site will be consistent with KSC's established building policies.

Construction at Alternatives B, C and D would occur on land that is much less disturbed. This could represent a substantial reduction in wetlands as well as the modification and occupancy of floodplains. Alternative E would result in no impacts.

b. **Operation.** Zoning within KSC requires that support facilities handling hydrazine be restricted to the HMF area. In addition, this type of facility requires a Q/D clear zone because of the potential for disaster and to insure human safety. These requirements are outlined in sections 2.5.2 "Zoning" and 2.5.8 "Special Zones and Clearances" of the ERD. Appropriately, all the alternatives are located in the HMF area with enough room to incorporate required Q/D clear zones. Operations at the proposed PSTF-R will require close coordination with the PHSF. Therefore, optimal land use would be attained by locating the PSTF-R in close proximity to the PHSF. Alternatives B and C are a considerable distance from the PHSF, thus increasing travel distance, travel time, gas consumption, and vehicle emissions. Based on these criteria the locations of alternatives A and D are much better, with A

representing that most optimal land usage. Overall Alternative A is expected to make more efficient use of land and existing facilities by incorporating the HOSF as part of the PHSF. The construction of the facility is an important step in the continuation of NASA's space program.

5.2.10 Historical and Archaeological

a. **Construction.** No historical or archaeological resources have been determined to exist at the alternative sites at this time. This determination is based on a review of Section 6.3 "Archaeological and Historical Surveys and Known Site Locations for KSC Vicinity" of the 1986 ERD, and an archaeological survey conducted in July, 1990, on the Preferred Alternative project site. The 1990 survey included digging 46 test pits throughout the site, the results of which were negative. Additionally, the Preferred Alternative had been previously disturbed when it was entirely cleared and planted with citrus. All historical sites discovered to date are well away from the alternative sites with nearly all on or near to the region's lagoon shorelines. Consequently, impact to either historical or archaeological resources is not anticipated to result from any of the alternatives.

b. **Operation.** No impact will occur.

5.2.11 Coastal Zone Management

a. **Construction.** Federal agency activities that affect Florida's coastal zone are required by Section 307 of the Coastal Zone Management Act of 1972 (CZMA), 16 U.S.C. Section 1456(c), and implementing regulations, 15 CFR, Part 930, to be consistent with Florida's Coastal Management Program. Under Florida Statutes (Chapter 380.23 F.S.), only those federal activities that significantly affect Florida's Coastal Zone will be evaluated for consistency with the Coastal Zone Management Plan.

The Preferred Alternative, being located several kilometer sand, would not significantly impact coastal zone resources and, thus, is consistent with the Coastal Zone Management Program. Due to their proximity to coastal waters, construction at Alternatives B, C and D would require evaluation as to their consistency with the Coastal Zone Management Plan.

b. **Operation.** No impact.

5.2.12 Floodplains

a. **Construction.** Under Executive Order 11988 "Floodplain Management" KSC is required to construct structures and facilities consistent with the Standards and Criteria of the

National Flood Insurance Program (NFIP CFR 60) and to locate facilities outside of floodplains where practicable. Under these criteria, structures and facilities must be protected from flood hazards and existing development must be protected from the effects of new development. In addition, NASA's implementing regulations 14 CFR, Part 1216 outline responsibilities specifically applying to NASA for the management of floodplains.

Based on the flood insurance rate map (FIRM) published by the Federal Emergency Management Agency, it appears that Alternative A occurs outside of the 500-year flood plain. Alternatives B, C, and D lie within the 100-year floodplain. With the exception of the immediate area of construction to be filled to an elevation of 9 to 10 feet NGVD, the existing grade and drainage ditches of Alternative A will be preserved. Because Alternative A entirely avoids floodplains, it complies with Executive Order 11988. Alternatives B, C and D are inconsistant with this order because there are other practicable alternatives.

b. Operation. No impact.

5.2.13 Wetlands

a. **Construction.** NASA regulations on wetlands management (14 CFR, Part 1216) were developed in accordance with Executive Order 11990: "Protection of Wetlands". These regulations provide that the use of wetlands will be avoided whenever possible. Variances are granted in situations where an analysis of possible options indicates that there is no practicable alternative.

Field investigations of the Preferred Alternative revealed that approximately 0.26 hectares (0.65 acres) of wetlands would be directly impacted by the filling of the 3-hectare (7.5 acres) "foot print". Figure 5 indicates where the wetlands impacts occur on the preferred alternative. The 0.01 hectares (0.02 acres) of impacts resulting from the emergency access road crossing the diagonal canal can be avoided by shifting this road to the west slightly. The 0.08 hectares (0.19 acres) of impact under the HPF footprint is the result of diverting the canal.

Construction in the other site alternatives would directly impact much more wetlands than the Preferred Alternative. Due to the small amount of wetland impacts Alternative A may be covered by NASA's existing use of a Nationwide Permit. A Water Resources Management Permit and a General

Isolated Wetland Permit from the SJRWMD will also be required.

To avoid as much wetland impacts as possible (as per 14 CFR, Part 1216) the footprint of the proposed action at the Preferred Alternative was redesigned, resulting in minimization of wetland impacts from 0.16 to 0.26 hectares (1.5 to 0.65 acres) (57% reduction). To be consistent with these minimization efforts, site alternatives B, C, and D should not be further considered and only the proposed location for the borrow pit should be considered.

Other than the alternatives outlined there are no other available sites within the HMF area. Additional alternatives would mean the expansion of this area and would require an extensive increase in KSC infrastructure (roads, utilities, etc.), which would cause their own environmental impacts. Therefore, there are no other practicable atlernatives.

b. **Operation.** Activities conducted at the PSTF-R will not substantiially impact wetlands. Stormwater detention ponds and swales will provide treatment to runoff in accordance with SJRWMD 40C-42 criteria prior to discharge to existing ditches. After treatment, runoff will be directed to waters of the state, but, by accomodating SJRWMD stormwater requirements,

potential impacts will be minimal. Stormwater permitting requirements, will be defined after NASA's early consultation with state and regional agencies is complete.

5.2.14 Socioeconomics

a. **Construction.** Construction manpower requirements may have a positive short term impact on local employment. However, the estimated numbers of workers are not expected to significantly affect the overall work force in the KSC area during this phase.

b. **Operation.** Based on KSC-DE-3523, the projected number of people to fully staff the PSTF-R will be 100. Most are expected to come from the NASA staff working at the present facility. When the Shuttle Transport System (STS) and the Launch Complex 39 (LC 39) facilities become fully operational, and with the special payload testing requirements necessitated by LAGEOS/Italian Research Interim Stage (IRIS), an increase in the number of personnel may be necessary to accommodate testing requirements and the anticipated increase in launch frequency. However, overall this increase represents a small increase above the present work force at KSC. Thus, it is not expected to cause a significant population influx nor impact the existing infrastructure.

5.2.15 Protected Species

Coordination between the USFWS, the FGFWFC, and NASA is ongoing. The PSTF-R BA was submitted to the USFWS by NASA as required by the Endangered Species Office (ESO). Subsequently, the USFWS has rendered a biological opinion concerning the impacts that Alternative A have to the continued existence of the Florida scrub jay and the eastern indigo snake (Appendix A). In addition, a BA was conducted and submitted to USFWS for the proposed location of the borrow pit (Appendix F). The results of the USFWS review of the borrow pit BA is pending.

Florida Scrub Jay (*Aphelcoma coerulescens coerulescens*)

a. **Construction.** During site visits to the PSTF-R Alternative A, one scrub jay was observed on two separate occasions. However, field investigations indicated that the scrub oak component of this scrub habitat, preferred by this species, was deficient. Use of Alternative A by this species is likely to be limited to the area's shrubby perimeter as confirmed by NASA's PSTF-R BA. It is possible that this peripheral usage may not be disrupted by construction activity because most activity will occur at the site's interior. The PSTF-R BA estimates that approximately 1-3 individuals utilize the

Preferred Alternative site. The USFWS biological opinion of the PSTF-R BA is that Alternative A is not likely to jeopardize the continued existence of the Florida scrub jay. The terms and conditions of this opinion are outlined in the USFWS letter (Appendix A).

It is not likely that the scrub jay utilizes the wetland habitat predominating the other site alternatives. The proposed borrow pit site may contain some potential scrub jay habitat although no individuals were found (Appendices E and F). The borrow pit BA located a single 3-year-old nest, but it is believed that the site no longer supports any scrub jays.

b. Operation. No significant impacts are expected.

Bald Eagle (*Haliaeetus leucocephalus*)

a. Construction. No bald eagles or eagle nests were observed at Alternative A or the proposed borrow pit site during the field investigations, nor does this alternative afford the appropriate habitat for this raptor's foraging. However, one active eagle nest is known to exist south of Alternative D. The eagle nest clearance zone overlaps much of this alternative, making construction of the PSTF-R at this alternative site environmentally untenable. Alternative C may provide some

foraging habitat for the bald eagles. Alternative E would not cause any impact to bald eagles.

b. **Operation.** No impact is expected in Alternative A or the proposed borrow pit site due to distance from the nearest nest and lack of suitable foraging habitat. Site alternatives B and C would not be expected to significantly impact the foraging activities of the eagles. Site Alternative D would encroach the clear zone established for an existing bald eagle nest and may affect the nesting behavior of these individuals, although minimally. No impact would occur from Alternative E.

Eastern Indigo Snake (*Drymarchon corais couperi*)

a. **Construction.** Construction at Alternative A and the proposed borrow pit would temporarily disrupt the habitat of indigo snakes. No indigo snakes were observed during field investigations at these sites, although some gopher tortoise burrows were present. It is predicted that, should indigo snakes be present, they will migrate from the site to escape construction activity. However, general mitigative procedures might entail the possible capture and relocation of individuals. NASA's PSTF-R BA gives a conservative estimate of two individual snakes occupying Alternative A. The USFWS biological opinion of the PSTF-R BA is that Alternative A is

not likely to joepardize the continued existance of the eastern indigo snake. The terms and conditions of this opinion are outlined in the USFWS letter (Appendix A). The proposed burrow pit BA estimates that 1-3 indigo snakes may utilize that site and warns that mitigation may be required. While opportunistic, the eastern indigo snake is not as likely to use the wetland habitat at the other alternative sites.

b. **Operation.** The indigo snake population is not expected to receive any substantial impact from the operations carried out at the facility.

Gopher Tortoise (*Gopherus polyphemus*)

a. **Construction.** No gopher tortoises were observed during field investigations of Alternative A or the proposed borrow pit site. However, five active burrows, one inactive and two abondoned burrows were observed on Alternative A and five inactive and one abandoned burrow was observed on the borrow pit site. Under Rule 39-27.002 of the Wildlife Code of the State of Florida, the taking, possessing, or transporting of any species of special concern (listed in 39-27.005) is prohibited except as permitted by the executive director of the FGFWFC, such permits being issued only upon reasonable conclusion that the permitted activity will not be detrimental to the survival

potential of the species. Further, Rule 39-25.002 FAC prohibits taking or possessing (unless acquired before July 1, 1988) any gopher tortoise or any part thereof, except as permitted by the executive director of the FGFWFC. The FGFWFC has issued a permit to the USFWS to relocate those individuals jeopardized by impending development at the KSC, provided that certain efforts are made to maximize the success potential of such relocation (See Appendix C). The KSC will request USFWS to relocate the gopher tortoises to an appropriate and suitable site. The other site alternatives are characteristically wetter and are expected to provide minimal gopher tortoise habitat.

b. **Operations.** It is expected that the status of this species at KSC will receive no substantial impact from operational activities at the proposed facility.

Gopher Frog (*Rana areolata*)

a. **Construction.** While the construction of the PSTF-R and borrow pit would temporarily disrupt the habitat of gopher frogs that may occur on the site alternatives, it is not expected to significantly impact this species' status at KSC. No gopher frogs were observed during field investigations at Alternative A or the proposed borrow pit site however, gopher tortoise

burrows were present, so it is possible that these frogs could use these burrows. Gopher frogs inhabiting Alternative A or the proposed borrow pit site would be expected to receive similar impacts as the gopher tortoise, as relocation is possible. Gopher frogs may also be present at Alternatives B, C and D.

b. **Operation.** Upon completion of construction, the periphery of Alternative A and the proposed borrow pit site is expected to again offer potentially suitable habitat. Gopher frog populations are not expected to receive any substantial impact. Gopher Frogs may be present at Alternative B, C and D.

Florida Mouse (*Podomys floridanus*)

a. **Construction.** Mice utilizing Alternative A will be displaced due to initial habitat loss. However, individuals occupying Alternative A are expected to move into contiguous habitat, which will remain untouched as clear zone. Upon cessation of construction activities, it is predicted that some individuals would recolonize appropriate ruderal habitats remaining on Alternative A. Thus, the status of the species at KSC will not be substantially impacted by the construction. Mice utilizing the proposed borrow pit site will experience habitat loss. This loss of a small amount of suitable habitat is not expected to substantially impact the Florida mouse population at KSC. The

other site alternatives, being dominated by wetlands, are not likely to contain substantive Florida mouse habitat.

b. **Operation.** No impact is expected.

Flora

Those species outlined in Section 4.4.8 were not identified at Alternative A or the proposed borrow pit site during field investigations. Only one of these species, the fragrant wool-bearing cereus (*Cereus eriophorus* var. *fragrans*), is currently federally protected by the USFWS. The others on the list are merely being considered for protection. Given the present level of disturbance at Alternative A it is unlikely that populations of these species occur there. It is possible that the other alternatives or the proposed borrow pit site may contain protected species of plants, though none have been identified at this time.

SECTION VI

REFERENCE INFORMATION

6.1 Agencies and Individuals Consulted

A) BRPH Architects/Engineers

(1) Lyle Houser
(2) Dick Mullins

B) NASA/KSC

(1) Danny Culbertson, DE-PMO-6
(2) John Ryan, DE-PMO-6
(3) Jim O'Malley, DF-FED-33
(4) Mario Busacca, DE-PMO-6
(5) Bob Deliwala, DM-MED-41
(6) Lu Richards, DF-FED-32

C) EG&G Florida, Inc.

(1) Andreas Goetzfried
(2) Patrice Hall

D) The Bionetics Corporation

(1) Dave Breininger

E) U.S. Fish and Wildlife Service

(1) David Wesley

F) Florida Game and Fresh Water Fish Commission, Endangered Species Coordinator

(1) Don Wood

G) Florida Department of Agriculture and Consumer Services, Plant Inspection

(1) Daniel Phelps

H) **Brevard County Soil Conservation Service**

(1) David Pruitt

I) **Brevard County Office of Natural Resources**

(1) Charles Pacamalan

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o. National Aeronautics and Space Administration. 1986. Environmental Resources Document, John F. Kennedy Space Center, NASA. KSC-DF-3080. Engineering Development Directorate. Kennedy Space Center, Florida.

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s. Schmalzer, P.A. and C.R. Hinkle. 1985. A Brief Overview of Plant Communities and the Status of Selected Plant Species at John F. Kennedy Space Center, Florida. A report prepared for NASA Biomedical Office, KSC by the Bionetics Corporation, Kennedy Space Center. 23 pp.

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v. Wood, Don. April 1991. Endangered and Potentially Endangered Fauna and Flora in Florida, Florida Game and Fresh Water Fish Commission. Florida Game and Fresh Water Fish Commission, Endangered Species Coordinator. Tallahassee, Florida.

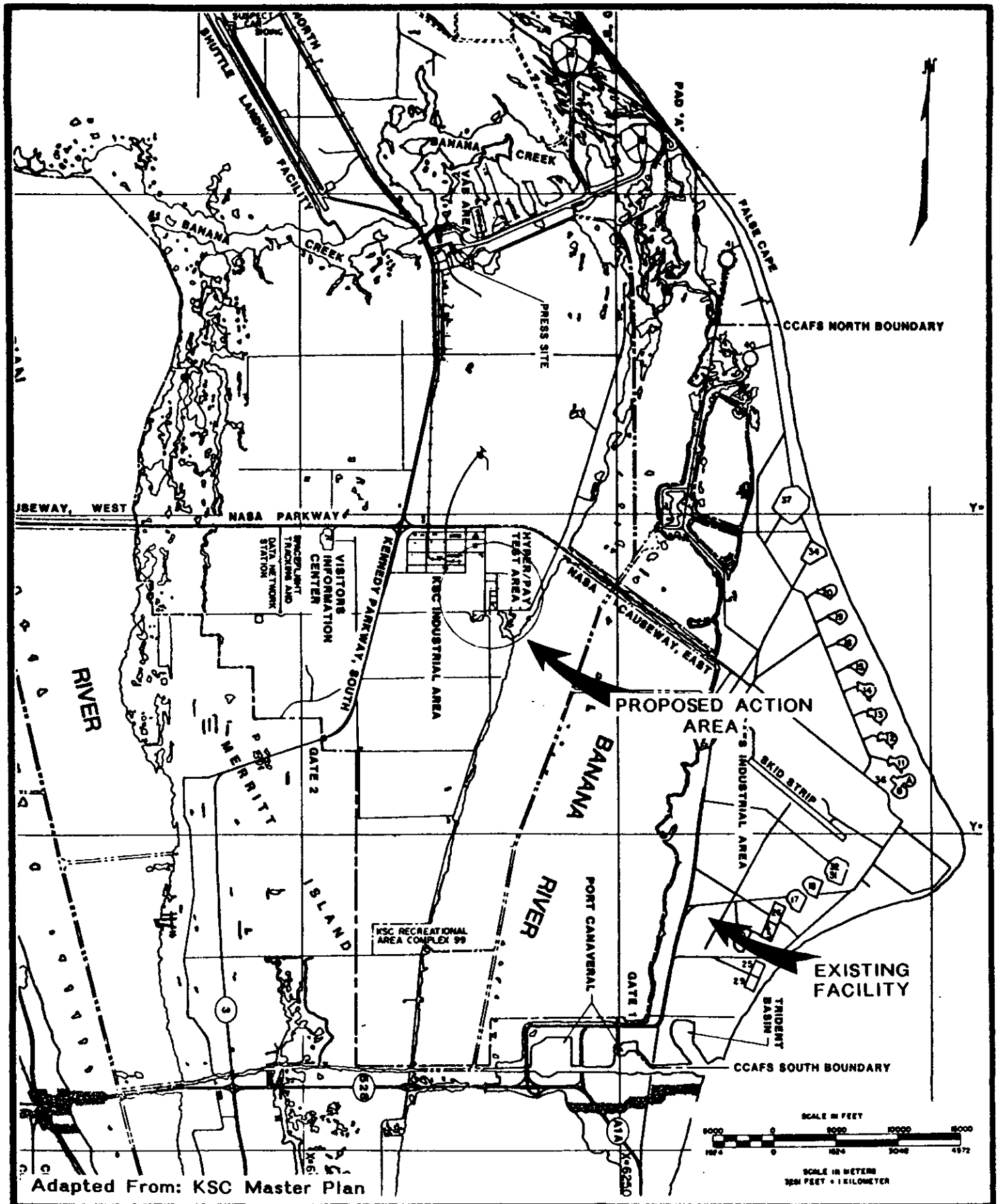
6.3 List of Preparers

a. Law Environmental Incorporated

1. David J. Fall
2. Michael D. Mesiano
3. Stephen W. Carney
4. Thomas E. Lodge, Ph.D
5. A.F. Robertson

b. NASA

1. Dan Culbertson KSC
2. Mario Busacca KSC
3. Kenneth Kumer NASA HQS



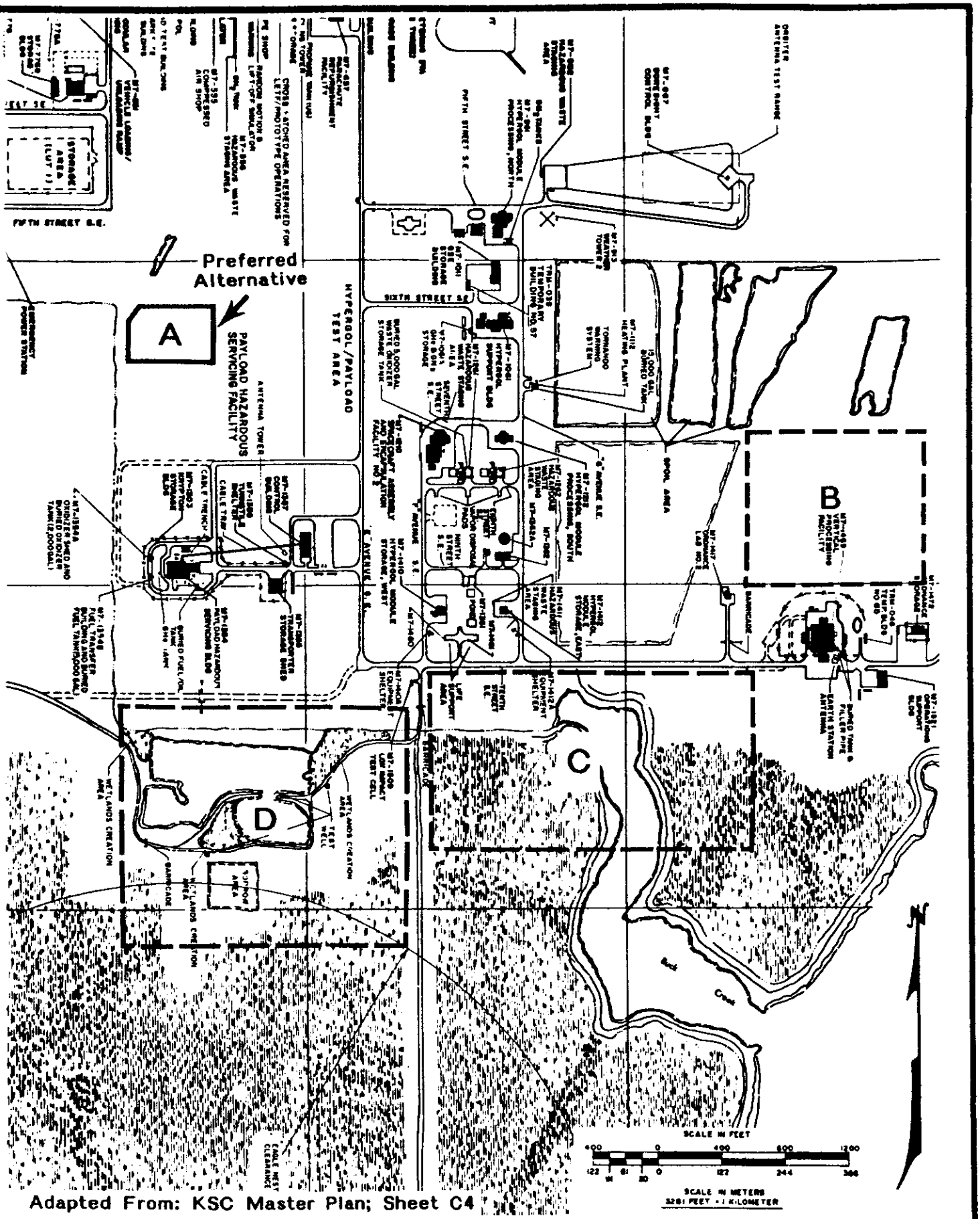
Adapted From: KSC Master Plan

FIGURE 1

LAW ENVIRONMENTAL, INC.
a professional engineering and earth science consulting firm

Proposed Action Location

DRAWN		JOB NO
CHECKED		57-1726
APPROVED		



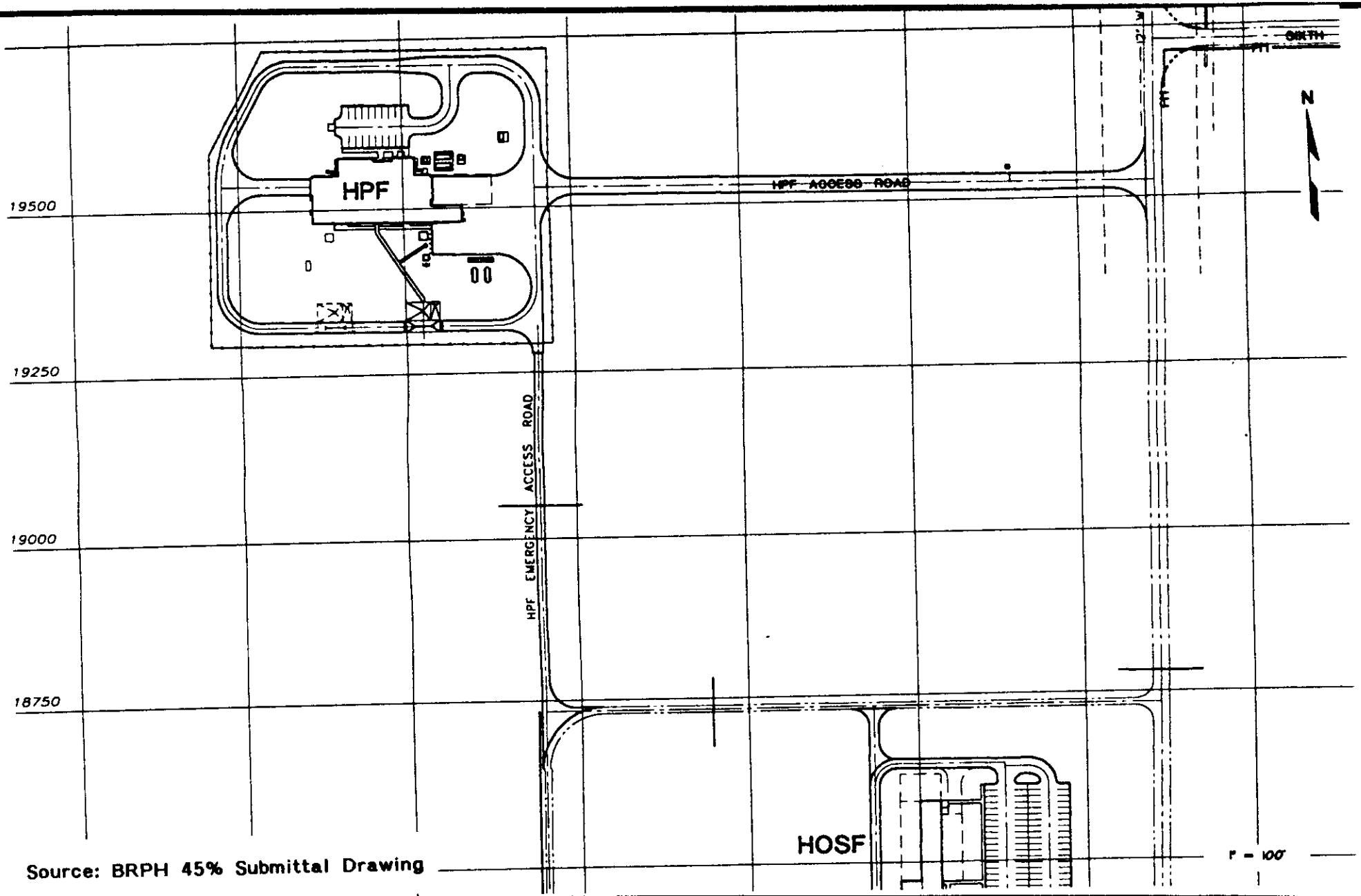
Adapted From: KSC Master Plan; Sheet C4

FIGURE 2

LAW ENVIRONMENTAL, INC.
a professional engineering and earth science consulting firm

Project Site Alternatives

DRAWN		JOB NO
CHECKED		57-1726
APPROVED		



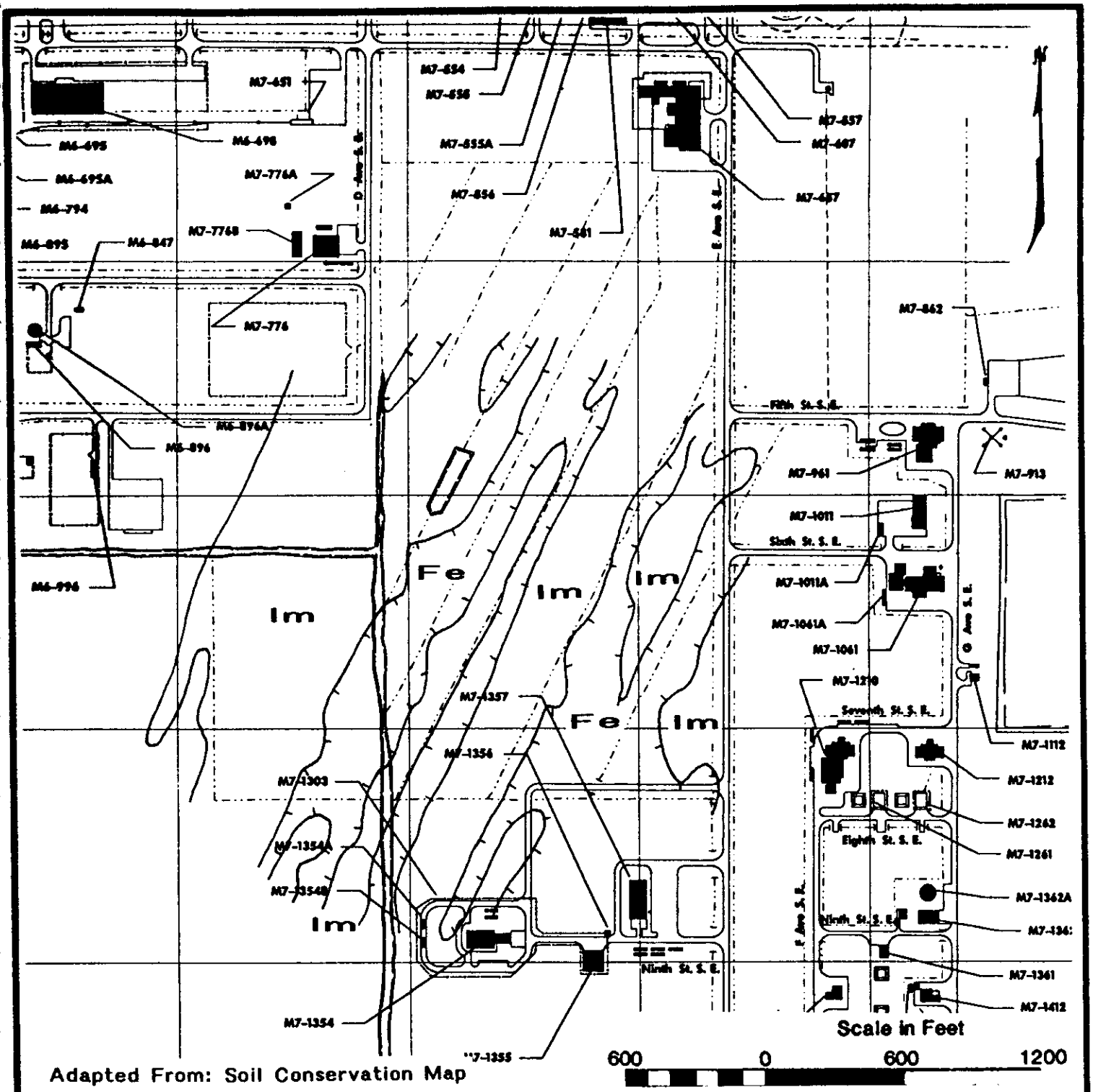
Source: BRPH 45% Submittal Drawing

FIGURE 3

LAW ENVIRONMENTAL, INC.
a professional engineering and earth science consulting firm

Site Configuration for Preferred Alternative

DRAWN		JOB NO.
CHECKED		57-1726
APPROVED		



Adapted From: Soil Conservation Map

Fe FELDA and WINDER SOILS: poorly drained soils found in low, broad, grassy sloughs with some slightly higher hammocks. The water table in the sloughs is within 10 inches below the soil surface for 2 to 6 months and typically between 10 and 40 inches the rest of the year. The water table lies slightly deeper in the hammocks.

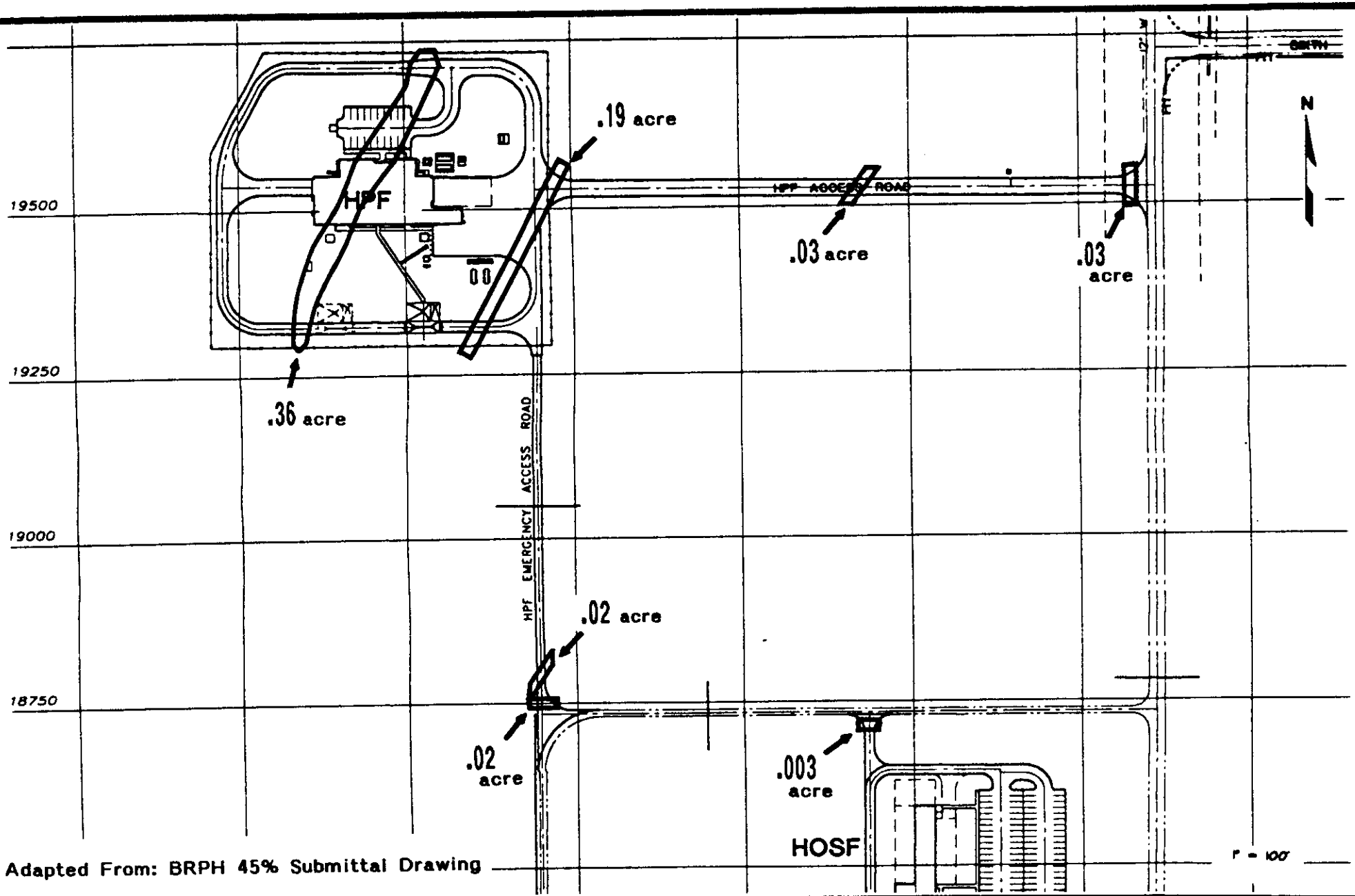
Im IMMOKALEE SAND: a nearly level, poorly drained sandy soil found in broad areas in the flatwoods, on low ridges between sloughs, and in low, narrow areas between sand ridges and lakes and ponds. The water table lies within 10 inches below the soil surface for 1 to 2 months and typically between 10 and 40 inches the rest of the year.

FIGURE 4

LAW ENVIRONMENTAL, INC.
a professional engineering and earth science consulting firm

Soil Types for Preferred Alternative

DRAWN		JOB NO
CHECKED		57-1726
APPROVED		



Adapted From: BRPH 45% Submittal Drawing

FIGURE 5

LAW ENVIRONMENTAL, INC.
a professional engineering and earth science consulting firm

Wetland Impacts for Preferred Alternative

DRAWN	
CHECKED	
APPROVED	

JOB NO. 57-1726

APPENDIX A
USFWS Biological Opinion for the Payload Spin Test Facility on John F. Kennedy Space Center

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3100 University Blvd. South
Suite 120
Jacksonville, Florida 32216

November 26, 1991

Mr. Walter T. Murphy
Director of Engineering Development
John F.Kennedy Space Center
Kennedy Space Center, Florida 32899

FWS Log No: 4-1-92-032D

Dear Mr. Murphy:

This represents the Biological Opinion of the Fish and Wildlife Service (Service), in accordance with Section 7 of the Endangered Species Act of 1973 (Act), as amended for the Payload Spintest Facility at Kennedy Space Center (KSC). The National Aeronautics and Space Administration (NASA) evaluated the impact this project would have on the Florida scrub jay (*Aphelocoma coerulescens coerulescens*) and eastern indigo snake (*Drymarchon corais couperi*), and determined may affect. A complete administrative record of this consultation is on file in this office.

Project Description

The project calls for constructing a processing facility, a hazardous operations support facility, parking lots and paved roads on 8.3 acres on the southeastern portion of the KSC Industrial Area.

Biological Opinion

The project will impact approximately four acres of low quality scrub habitat. Based on field surveys, several scrub jays were observed along the edge of the mowed grass on the east side of the site. Most of the scrub in the area exceeds optimal height, and is very dense with minimal open space. A scrub jay nest was found in the general area, but not within the project site. Using home range data collected on KSC, this habitat could support 1 to 3 scrub jays, or a part of one family's territory.

The project site has suitable habitat for the federally threatened eastern indigo snake. Based on research conducted on KSC, the home range of this species is between 76-258 acres. The project site, at a maximum, accounts for less than 5 percent of a home range.

The importance of KSC to the survival and recovery of Florida scrub jays has been well documented in previous Biological Opinions. The population estimate for KSC is

approximately 2,500 scrub jays. The Service and KSC have developed a "Compensation Plan for Impacts to Scrub Habitat from NASA Construction Projects on Kennedy Space Center" (Enclosure 1). The plan calls for the creation/restoration of approximately 300 acres of scrub habitat on KSC to compensate for the loss of about 150 acres of scrub over the next four years as a result of 12 proposed projects. This project is one of the 12 projects identified in the plan. To compensate for this loss, KSC will provide funding to Merritt Island National Wildlife Refuge (MINWR) in FY 93 to create/restore 18 acres of scrub habitat, as stipulated in the plan. The 18 acres will also compensate for three additional projects that may come on line in FY 92. NASA will provide the necessary funding to complete 18 acres at one time.

Based on our review of this project and the compensation plan that the Service accepted, it is the Service's Biological Opinion this project is not likely to jeopardize the continued existence of the Florida scrub jay or eastern indigo snake.

Incidental Take

Florida Scrub Jay

Section 9 of the Act prohibits the taking of listed species without a special exemption. Taking is defined to mean harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Taking can only be authorized through special provisions.

The Service has reviewed the biological information and other available information relevant to this action, and based on our review, we anticipate that a maximum of three scrub jays may be taken as a result of the construction of this facility. NASA is authorized, therefore, to take up to a maximum of three Florida scrub jays on KSC for the purpose of constructing the Payload Spintest Facility.

When providing an incidental take statement, the Service is required to give reasonable and prudent measures it considers necessary or appropriate to minimize the take, along with terms and conditions that must be complied with to implement the reasonable and prudent measures. Furthermore, the Service must also specify procedures to be used to handle or dispose of any individual specimens taken. The Service believes the following reasonable and prudent measure is necessary and appropriate to reduce the impact of take on the Florida scrub jays.

Reasonable and Prudent Measures

NASA and the Service have developed a plan to create/restore up to 300 acres of scrub habitat to compensate for the loss of 150 acres of scrub on KSC over the next four years. The first phase of the plan is to create/restore 18 acres of scrub. NASA will provide MINWR appropriate funding in FY 93 to complete the work. The Service concurs with this schedule. The site for creation/restoration has been selected and agreed to by both agencies.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measure must be met.

1. Nasa must provide MINWR with the necessary funding to create/restore 18 acres of scrub by October 1, 1992.

2. If in the course of the operational phase of the project a dead scrub jay is found, the carcass should be frozen immediately, and the Jacksonville Field Office notified within 24 hours for disposition (904-791-2580)

3. If during the construction phase of the project the incidental take of three birds is reached, NASA should suspend all work and immediately reinitiate consultation with the Service.

Eastern Indigo Snake

The Service has reviewed the biological information presented in the assessment. Based on our review, incidental take of the eastern indigo snake is not authorized. If an incident involving an eastern indigo snake occurs, the Jacksonville Field Office should be contacted within 24 hours. We recommend that NASA instruct construction personnel that no snake should be killed, and if an eastern indigo snake is observed, it should be permitted to move off the site.

This concludes Section 7 consultation. If modifications are made in the project or if new information on listed species becomes available, please notify our office as reinitiation of consultation may be required.

Wetland Impacts

During the early planning of this project, NASA calculated that the footprint of the facility would result in impacting 1.5 acres of freshwater wetlands. To reduce this impact, NASA shifted the facility which reduced the impact area by one acre. While we believe NASA has minimized the fill area, NASA must obtain a Section 404 permit from the Corps of Engineers. We will provide our formal comments during the public notice review.

Sincerely yours,

David J. Wesley
Field Supervisor

Enclosure

cc: Ron Hight-MINWR

APPENDIX B
Letters of Early Consultation

DE-PMO-6

Office of Environmental Services
Florida Game and Fresh Water Fish Commission
110 43rd Avenue, S.W.
Vero Beach, Florida 32399

SUBJECT: Early Consultation for Wetlands Impact for NASA Payload Spintest Facility Replacement

The National Aeronautics and Space Administration is currently evaluating the environmental impacts for a proposed new facility at the John F. Kennedy Space Center. During the course of the evaluation approximately 1.5 acres of apparent wetlands were discovered within the footprint of the proposed facility. The facility design was altered (see enclosures) to avoid most of the apparent wetland. However, after additional evaluation, approximately 0.5 acres remains within the footprint. Due to safety and mission constraints, the facility cannot be further altered without serious impact to its functionality. The apparent wetland is a depressed area vegetated predominately with willow (Salix caroliniana), grape (Vitis rotundifolia) and with some mixed arrowhead (Sagitaria spp.) Historical aerial photography indicates the region was previously citrus grove with transverse drainage swales. The apparent wetland is within one of these swales and is currently being surveyed as part of the Environmental Assessment for the project.

We will be submitting a dredge and fill permit application and stormwater system permit application to the St Johns River Water Management District. While we believe this area has minimal, if any, wetland value, we are required by Federal regulations to include potential mitigation costs in our early evaluations of proposed actions in wetlands. We therefore respectfully request an early consultation for this site to discuss any actions necessary to comply with Florida law regarding wetlands.

Please address any questions regarding this matter to Mr. Dan Culbertson at (407) 867-4049.

Walter T. Murphy
Director of Engineering Development

3 Enclosures

cc:
St Johns River Water Management District, Melbourne Office
U.S. Fish and Wildlife Service, Vero Beach Office
U.S. Army Corps of Engineers, Tampa Office
East Central Florida Regional Planning Council, Winter Park Office

DE-PMO-6

St. Johns River Water Management District
305 East Drive
Melbourne, Florida 32904

SUBJECT: Early Consultation for Wetlands Impact for NASA Payload Spintest Facility Replacement

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Walter T. Murphy
Director of Engineering Development

3 Enclosures

cc:
Florida Game and Fresh Water Fish Commission, Vero Beach Office
U.S. Fish and Wildlife Service, Vero Beach Office
U.S. Army Corps of Engineers, Tampa Office
East Central Florida Regional Planning Council, Winter Park Office

DE-PMO-6

East Central Florida Regional Planning Council
Attn: Project Review Division
1011 Wymore Road, Suite 105
Winter Park, Florida 32789

SUBJECT: Early Consultation for Wetlands Impact for NASA Payload Spintest Facility Replacement

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Please address any questions regarding this matter to Mr. Dan Culbertson at (407) 867-4049.

Walter T. Murphy

3 Enclosures

cc:
St Johns River Water Management District, Melbourne Office
Florida Game and Fresh Water Fish Commission, Vero Beach Office
U.S. Fish and Wildlife Service, Vero Beach Office
U.S. Army Corps of Engineers, Tampa Office

DE-PMO-6

U. S. Army Corps of Engineers
CESAJ-RD-FT
P. O. Box 19247
Tampa, Florida 33606-9247

SUBJECT: Early Consultation for Wetlands Impact for NASA Payload Spintest Facility Replacement

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We will be submitting a dredge and fill permit application with our storm-water system permit application to the St Johns River Water Management District. While we believe this area has minimal, if any, wetland value, we are required by NASA's implementation of Executive Order 11990 "Protection of Wetlands" to consult with the local office of the U. S. Army Corps of Engineers and to include potential mitigation costs in our early evaluations of proposed actions in wetlands. We therefore respectfully request an early consultation for this site to discuss any actions necessary to comply with Federal law regarding wetlands.

Please address any questions regarding this matter to Mr. Dan Culbertson at (407) 867-4049.

Walter T. Murphy
Director of Engineering Development

3 Enclosures

cc:
St. Johns River Water Management District, Melbourne Office
Florida Game and Fresh Water Fish Commission, Vero Beach Office
U.S. Fish and Wildlife Service, Vero Beach Office
East Central Florida Regional Planning Council, Winter Park Office

DE-PMO-6

U. S. Fish and Wildlife Service
P.O. Box 2676
Vero Beach, Florida 32961

SUBJECT: Early Consultation for Wetlands Impact for NASA Payload Spintest Facility Replacement

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Walter T. Murphy
Director of Engineering Development

3 Enclosures

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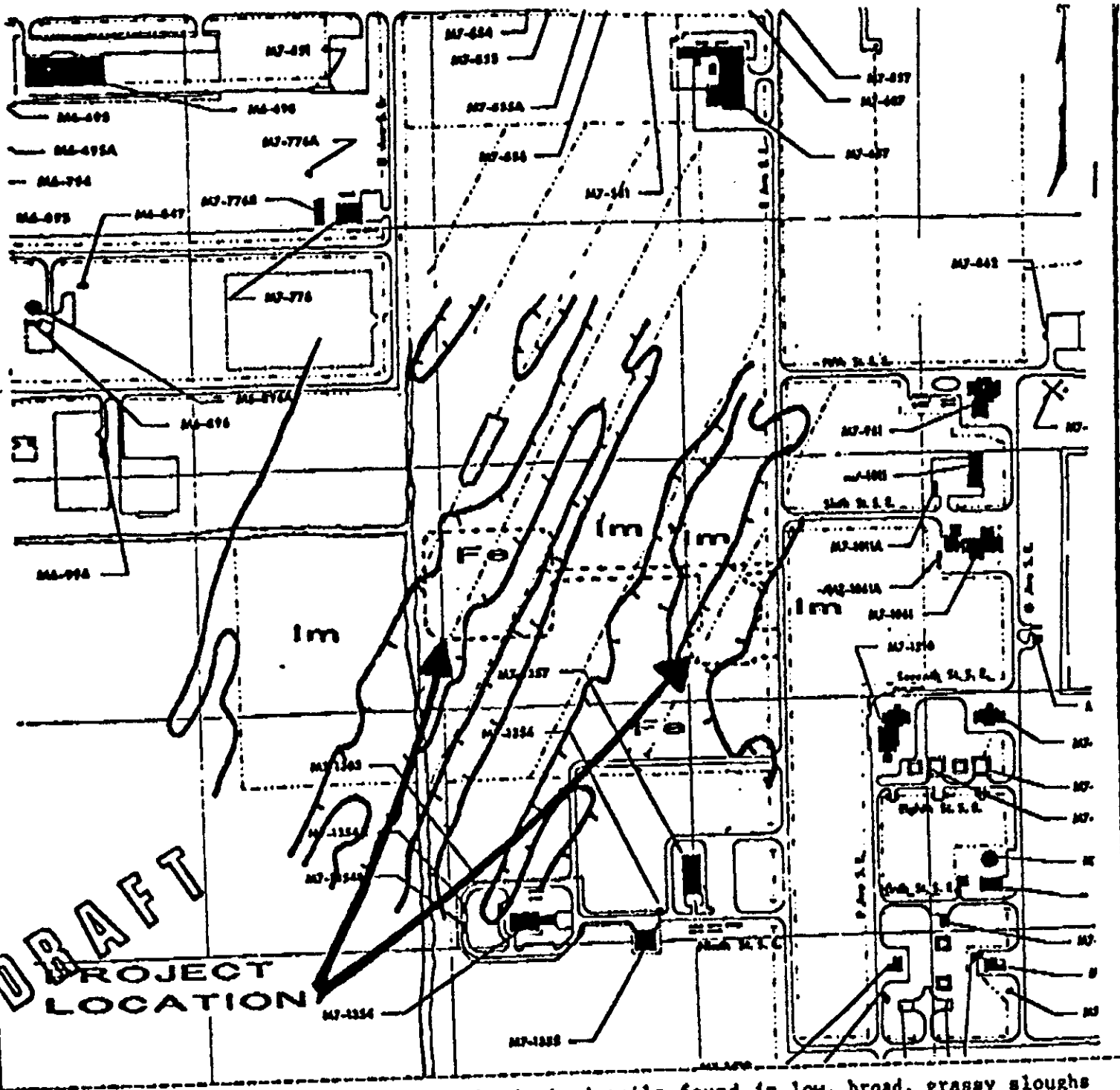
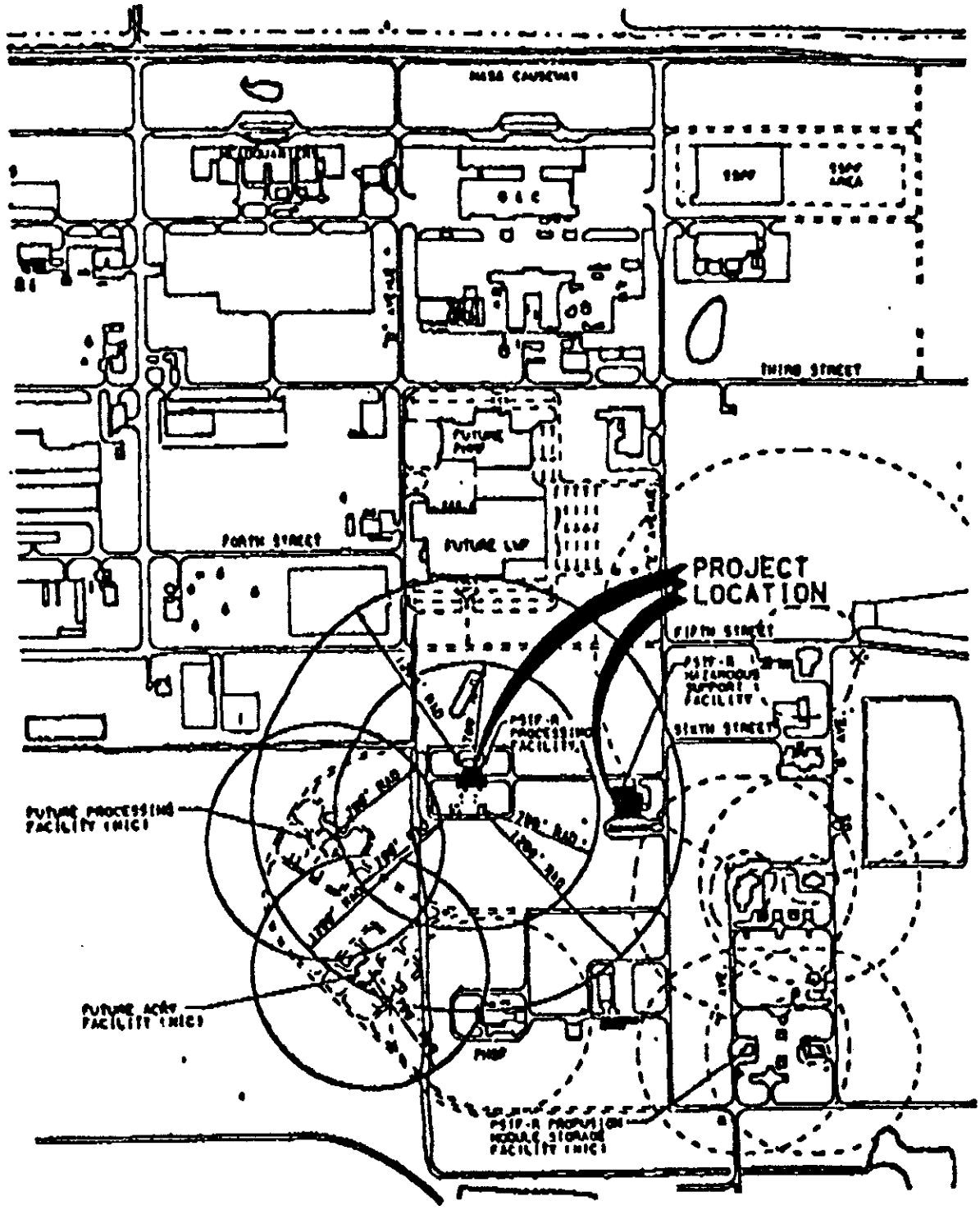
Florida Game and Fresh Water Fish Commission, Vero Beach Office
U.S. Army Corps of Engineers, Tampa Office
East Central Florida Regional Planning Council, Winter Park Office



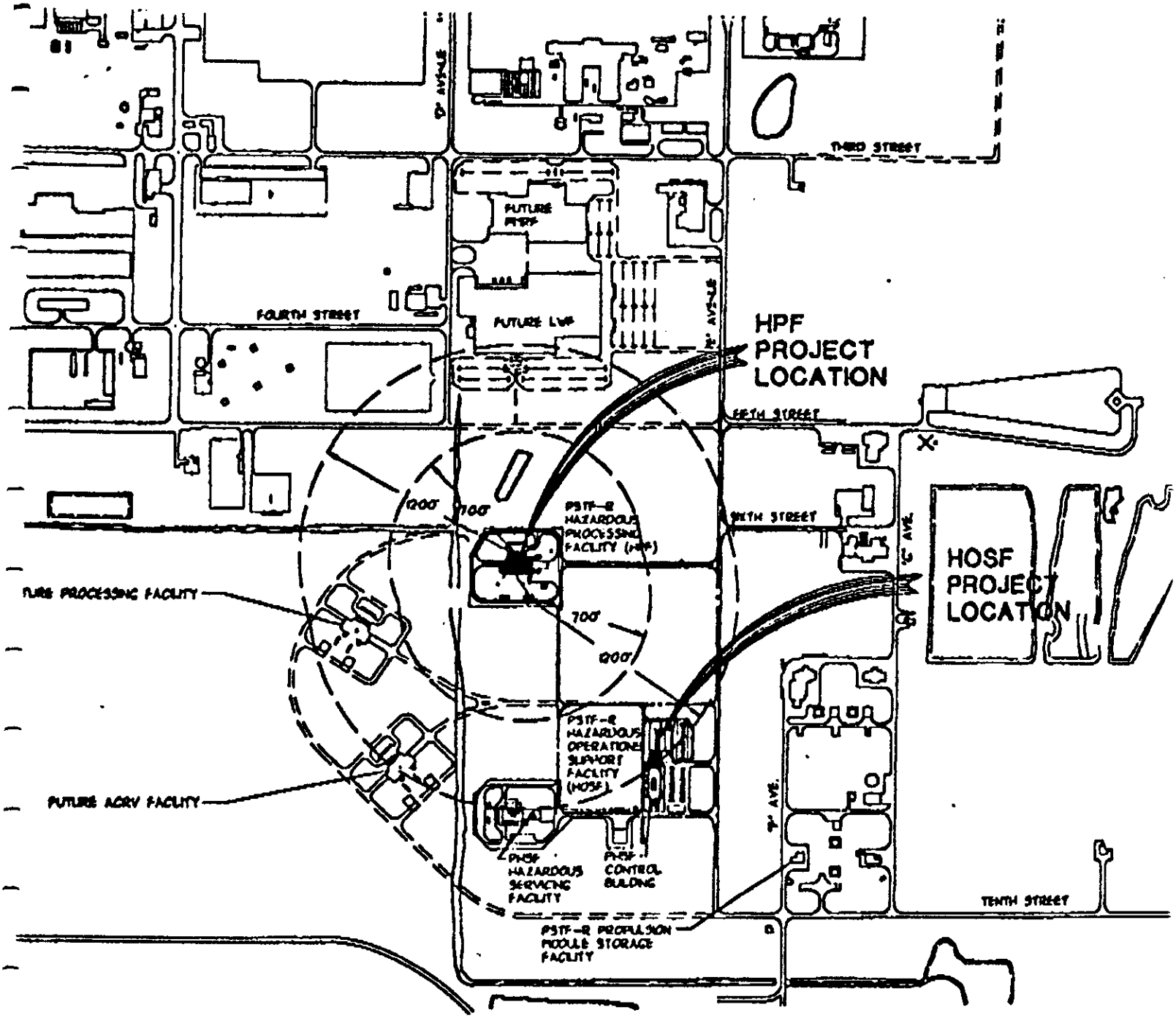
Fe FELDA and WINDER SOILS: poorly drained soils found in low, broad, grassy sloughs with some slightly higher hammocks. The water table in the sloughs is within 10 inches below the soil surface for 2 to 6 months and typically between 10 and 40 inches the rest of the year. The water table lies slightly deeper in the hammocks.

Im IMMOKALEE SAND: a nearly level, poorly drained sandy soil found in broad areas in the flatwoods, on low ridges between sloughs, and in low, narrow areas between sand ridges and lakes and ponds. The water table lies within 10 inches below the soil surface for 1 to 2 months and typically between 10 and 40 inches the rest of the year.



PSTF-R

ORIGINAL DESIGN



PSTF-R LOCATION PLANS

1" = 400'

AS REDESIGNED

APPENDIX C
Gopher Tortoise Relocation Permit

FLORIDA GAME AND FRESH WATER FISH COMMISSION

601 Ken
602 X
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X-Action
O-Review
F-File

Please return to Bruce
Dwight should keep copy of permit letter!
Ke Ken

June 29, 1989

Mr. Stephen R. Vehrs, Manager
Merritt Island National Wildlife Refuge
Post Office Box 6504
Titusville, FL 32782

Mr. Vehrs:

Pursuant to your 21 June application, and in accordance with Rules 39-25.002 and 39-27.002 of the Wildlife Code of the State of Florida (Title 39, F.A.C.), this constitutes Permit WR89125, authorizing you to live-capture, relocate and release gopher tortoises (Gopherus polyphemus) in Florida, subject to the following provisions:

1. Gopher tortoises may be live-captured by non-harmful means, relocated and released as needed in association with development or development related projects on Merritt Island, Brevard County, but only when 10 or fewer gopher tortoises are affected per given project and only subsequent to individual coordination/approval of each operation by this office. Any gopher tortoise burrow commensals encountered in the capture operations may likewise be live-captured, relocated and released. When needed, tortoises may be temporarily held in captivity, but only for periods not exceeding two weeks and only pursuant to the enclosed guidelines.

2. This permit does not authorize access to any public or private properties. In instances where written or verbal permission for access is required, such permission must be secured from the appropriate landowners or public agencies in advance of undertaking any work on those controlled properties.

3. This permit is nontransferable. Other qualified personnel may assist in the permitted activities, but only in the presence of your direct supervision.

4. This permit must be readily available for inspection at all times while engaging in the permitted activities. Formally designated assistants are also to be in possession of your letter of authorization.

5. A detailed report describing each relocation operation is to be provided this office within 14 days of each such relocation. A report form is enclosed for use in that regard. Copies of any other reports or publications which result from the work must also be provided upon their availability.

7. This permit expires 30 June 1992, but is subject to revocation prior to that time pursuant to Chapter 120, Florida Statutes.

Colonel Robert M. Brantly
Executive Director

BY: Frank Montalbano III, Director
Division of Wildlife

W666-13A/jh4335
LIC 6-13
Enclosures
cc: Lt. Colonel Robert Butler
Ms. Julie Mavis
Mr. Joan Diemer

FLORIDA GAME AND FRESH WATER FISH COMMISSION

ROBERT M. BRANTLY, Executive Director
ALLAN L. EGBERT, Ph.D., Assistant Executive Director

FARRIS BRYANT BUILDING
620 South Meridian Street
Tallahassee, Florida 32399-1600
(904) 488-1960

M E M O R A N D U M May 16, 1991

TO: Generic Gopher Tortoise Relocation Permit Holders

FROM: Don A. Wood, Endangered Species Coordinator

SUBJECT: Authorization to Exercise Generic Permits

601
602 X
603
604
605
606
607
608
609
701
X-ACW

– I have a copy.

The process by which we authorize the use of generic gopher tortoise permits is herewith changed in two respects:

1. Authorizing generic relocation permit use is now effected by Commission personnel distributed throughout the state (previously, that was the responsibility of only Joan Diemer and/or me). Lists depicting county-by-county responsibilities in that regard, and addresses and phone numbers of the personnel involved, are attached for your reference.

2. Generic permits may now be exercised only upon written authorization from the personnel involved (previously, such authorization was conferred verbally). In emergency situations, such authorizations might be faxed, but otherwise you should anticipate a one or two day lapse from the time of contact to receipt of authorization.

Henceforth, please follow this new procedure when exercising your generic permit is called for. Thank you for your cooperation.

666-0466/jh
LIC 6-20
Attachments
cc: Mr. Tim O'Meara
Personnel Processing Gopher Tortoise Permit Applications

APPENDIX D
Memo for Record Between NASA and SJRWMD

National Aeronautics and
Space Administration

John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

NASA

NOV 7 1991

Reply to Attn of DE-PMO-6

St. Johns River Water Management District
Attn: Michele Rieber/Perry Jennings
305 East Drive
Melbourne, FL 32904

Thank you for your advice and consultation on the NASA/KSC PSTF-R project. A memo for record is enclosed indicating my understanding of the outcome of these meetings. As this memo will be quoted in the Environmental Assessment for this project, if you feel any position has been misstated, please let me know as soon as possible.

Danny R. Culbertson

Enclosure

cc:
David Fall, Law Environmental
Ken Kumor, NASA Headquarters
Patrice Hall, KSC EG&G 831.3

MEMO FOR RECORD

Date: 11/07/91

Subject: PRE-APPLICATION CONSULTATION BETWEEN KSC AND SJRWMD ON WETLAND IMPACT AND STORMWATER SYSTEM FOR PSTF-R

Representatives of the St Johns River Water Management District Melbourne FL Office met with NASA/KSC representatives at the PSTF-R site on 10/25/91 and 11/6/91 to investigate the expected wetlands impact of the project. On 11/7/91 the parties met to discuss the proposed stormwater system and any potential wetland mitigation requirements. The SJRWMD indicated that based on the design information provided at the meetings and given that the facility was designed to maximize avoidance of on-site wetlands and that only a small area of low value wetlands remain, additional wetland mitigation requirements will probably not be required as conditions of the project Dredge and Fill permit. The stormwater treatment concept proposed was considered acceptable provided that all stormwater treatment requirements are met in the project Stormwater permit application.

Meeting Attendees:

10/25/91
Dan Culbertson, NASA/KSC; Patrice Hall, EGG/KSC; Michele Rieber, SJRWMD; Perry Jennings, SJRWMD

11/6/91
Dick Mullins, BRPH/KSC; Michele Rieber, SJRWMD

11/7/91
Dan Culbertson, NASA/KSC; Dick Mullins, BRPH/KSC; Michele Rieber, SJRWMD; Perry Jennings, SJRWMD

Dan R Culbertson

Dan R. Culbertson

APPENDIX E
Environmental Evaluation of the Proposed Borrow Pit Site Associated with the PSTF-R

ENVIRONMENTAL EVALUATION OF THE PROPOSED BORROW PIT SITE ASSOCIATED WITH THE PSTF-R

Purpose of Project

A source of fill material will be required for the proposed construction of the Payload Spin Test Facility Replacement (PSTF-R). A new borrow pit in the Industrial Area will be required as other sources of fill in the area have been exhausted and it is not economically feasible to bring fill from other areas. This evaluation addresses potential environmental impacts associated with the construction of a 11 hectare (27-acre) borrow pit located south of the Payload Hazardous Servicing Facility (PHSF) between "D" Avenue S.E. and "E" Avenue S.E. (Figure A-1). This evaluation was conducted in conjunction with the Environmental Assessment (EA) for the PSTF-R. A biological assessment (BA) was conducted for this site by Bionetics Corporation and is included as Appendix F of this document.

Project Description

The proposed project will involve the excavation and dewatering of approximately 11 hectares. Site access will be from an existing dirt access lane on Tenth Street S. E. Removed fill material would be used during the construction of the PSTF-R and for future construction projects in the Industrial Area. The removal of fill would occur as cells, with separate cells being excavated for each construction project. After excavation of a cell is

complete, it would be connected to previous cell(s) and become available for on-site water retention during future excavation activities.

Alternative locations were considered for the borrow pit. These alternatives include the same alternative site locations considered for the PSTF-R and are the only other possible locations within the Industrial Area. The area north of the Vehicle Processing Facility (VPF), the area southeast of the VPF, and the area south of Ransom Road between "E" and "D" Avenues are all more environmentally sensitive than the proposed locations. For more detailed descriptions of these alternative sites, see Sections 1.2, 3.2, and 4.3 of this Environmental Assessment.

The borrow pit would be excavated to a depth of no more than 3 meters (10 feet). The existing vegetation would be cleared and burned or removed from site and disposed of off KSC. Unsuitable material will be removed from the site or used to slope and dress the sides of the excavation. The borrow excavation side slopes would be no steeper than 2H:1V at 1 meter (3 feet) below the water line and 4H:1V from the excavation and above.

Discharges from dewatering operations could be directed to neighboring canals or retained. If discharging into canals occurs, then consumptive use of water permitting from the SJRWMD would be required according to Chapter 40C-2. In addition, an NPDES permit may be required due to discharges from dewatering. It would be necessary to file this permit

6 months in advance, and it would be valid for 5 years. "Best management practices" would be employed (turbidity curtains, etc.) to minimize impacts to water quality. Additionally, the incremental construction of excavation cells would provide possible on-site retention of water, thereby minimizing turbidity impacts of the nearby surface water. If dewatering discharge retention is conducted, then dewatering operations would be exempt from consumptive use of water permitting according to Chapter 40C-2.051(3)(a).

After the removal of fill for the PSTF-R project is complete, a surface water connection may be made to canals on the west and south sides of the site. Stormwater flow from the west canal would be diverted into the borrow pit for retention with an eventual outfall to the south canal. As future projects remove fill, the amount of retention volume would increase, ultimately providing stormwater retention for the KSC Industrial Area.

Description of Affected Environment

Felda and Winder soils, classified as hydric soils by the Soil Conservation Service (SCS) of Brevard County, represent approximately 30 to 40 percent of the site according to SCS maps. Soil samples observed on November 11 and November 12, 1991 indicated the existence of hydric soils in four areas described below. The remainder of the site was mapped as non-hydric Immokalee Fine Sand by the SCS.

Several different vegetative communities were observed on the site. Approximately 30 percent of the site was typified by hardwood hammocks.

The canopy of these hammocks was dominated by live oak (*Quercus virginiana* var. *geminata*) and cabbage palm (*Sabal palmetto*). Many of the oaks were draped with spanish moss (*Tillandsia usneoides*), ball moss (*Tillandsia recurvata*), and some grape (*Vitis rotundifolia*). The understory of these hammocks contained scattered saw palmetto (*Serenoa repens*).

Scrub habitat made up another 25 percent of the site. These areas were dominated by scrub oak (*Quercus virginiana var. geminata*) with scattered slash pine (*Pinus elliottii*) and scattered stands of saw palmetto, and fetterbush (*Lyonia lucida*).

Another 25 percent of the site identified as closed immature forest contained dense vegetation consisting of myrtle oak (*Q. myrtifolia*) , wax myrtle (*Myrica cerifera*), and fetterbush, with some salt bush (*Baccharis* spp.).

The west, south, and east fringes of the site (approximately 10 percent of the site) were dominated by wild grape. This domination was especially evident at the southern and western edges of the site where spoil mounds lined the canals. Scattered, small areas of Brazilian pepper (*Schinus terebinthifolius*) were present at or near these fringes.

The remainder of the site consisted of four distinct areas of wetland vegetation. The first area was a ditch that traversed nearly the length of the site from east to west (Area A on Figure A-2). The ditch ranged from 1.5 to 2 meters deep with very steep banks and was not connected to the surface waters bordering the site. The wetland area within the ditch ranged from 1

to 3 meters wide and was observed to have some standing water, more than 3 decimeters deep in some places. The dominant vegetation was swamp fern (*Blechnum serrulatum*) with some coastal plain willow (*Salix caroliniana*), cinnamon fern (*Osmunda cinnomomea*), salt bush, cabbage palm, wax myrtle, and patches of arrowhead (*Sagittaria* sp.). Soils in the bottom of the ditch were found to be hydric. This area was determined to be approximately 0.2 hectares (0.4 acres).

The second wetland area was located in approximately the center of the site and can be described as a graminoid marsh (Area B on Figure A-2). The understory of the marsh consisting of approximately 80 percent cordgrass (*Spartina bakeri*), 10 percent mix of cinnamon fern and chain fern (*Woodwardia* sp.), and 10 percent sphagnum moss (*Sphagnum* sp.). Occasional areas where bloodroot (*Lachnanthes caroliniana*) flourished were also observed. Wax myrtle covered approximately 10 percent of the area and was the only midstory species present. Overhead, slash pine covered approximately 20 percent of the site. Soils, characterized as hydric, were saturated and there was standing water observed in some areas. This wetland was determined to be approximately 0.1 hectares (0.3 acres).

The third area characterized by wetland vegetation was located along the eastern edge of the site (Area C on Figure A-2). This area was 70 to 90 percent covered by a mix of blechnum fern and royal fern (*Osmunda regalis*). The remainder of this wetland area contained arrowhead, coastal plain willow,

sawgrass (*Cladium jamaicense*), cannas (*Canna* sp.), beak-rush (*Rhynchospora* sp.), umbrella flatsedge (*Cyperus alternifolius*), yellow-eyed grass (*Xyris fimbriata*), smartweed (*Polygonum* sp.), and wild grape. No standing water was found there, but much of the soil was found to be hydric. This area was approximately 0.2 acres.

The final area characterized by wetland vegetation was the swale that runs along the west side of "E" Avenue S.E. (Figure A-2). This swale would be impacted by a temporary access road connecting "E" Avenue S.E. to the borrow pit with approximately 0.03 acres being filled.

No Florida scrub jays (*Aphelocoma coerulescens coerulescens*) were observed during the field visit. The scrub habitat and the northern edge of the site could potentially offer breeding and/or foraging habitat for this species. There are, however, no prescribed burns performed here to maintain this area as scrub jay habitat. The BA conducted for this site found a three year old scrub jay nest, but no actual scrub jays were sighted within or immediately surrounding the sight. No gopher tortoises (*Gopherus polyphemus*) were observed, although 5 apparently inactive burrows and 1 abandoned burrow were found. The BA did not find any gopher tortoises either, but 6 active and 3 inactive burrows were located. The habitat provided by the burrows could possibly support the eastern indigo snake (*Drymarchon corais couperi*), the gopher frog (*Rana areolata*), and the Florida mouse (*Podomys floridanus*).

Environmental Effects

Project implementation would impact approximately 11 hectares comprised primarily of hardwood hammocks, scrub habitat, closed immature forest, and areas dominated by wild grape. A total of 0.38 hectares (0.93 acres) of wetlands would be impacted.

The BA concluded that the construction area cannot be considered scrub jay habitat and therefore not impacted, although potential gopher tortoise, eastern indigo snake, gopher frog, and Florida mouse habitat would be eliminated. The USFWS has been issued a permit by the FGFWFC to relocate any gopher tortoises jeopardized by impending development at KSC. This permit includes the relocation of commensal species such as the eastern indigo snake, the gopher frog, and the Florida mouse. Therefore, following these procedures, impacts to these species could be minimized.

Two listed plant species were present on the site and include cinnamon fern and royal fern. These species are listed as "commercially exploited" by the Florida Department of Agriculture (FDA). Although there are no requirements for the relocation or avoidance of these plant species, the FDA, local nurseries, and local horticultural personnel should be contacted and allowed access to the site before excavation for the purpose of plant collection. This plant collection would help to minimize impacts to these plant species.

Development of the borrow pit would result in the creation of 11 hectares of surface water, which would offer a variety of aquatic and wetland habitat values and functions. This borrow pit may also provide stormwater detention for the KSC Industrial Area when completed.

Dredging and clearing activities would produce episodic equipment emissions and elevated dust levels and will vary with the amount of fill needed for individual projects. To accommodate Q/D requirements at the PHSF, operations at the borrow pit would be interrupted during certain PHSF activities.

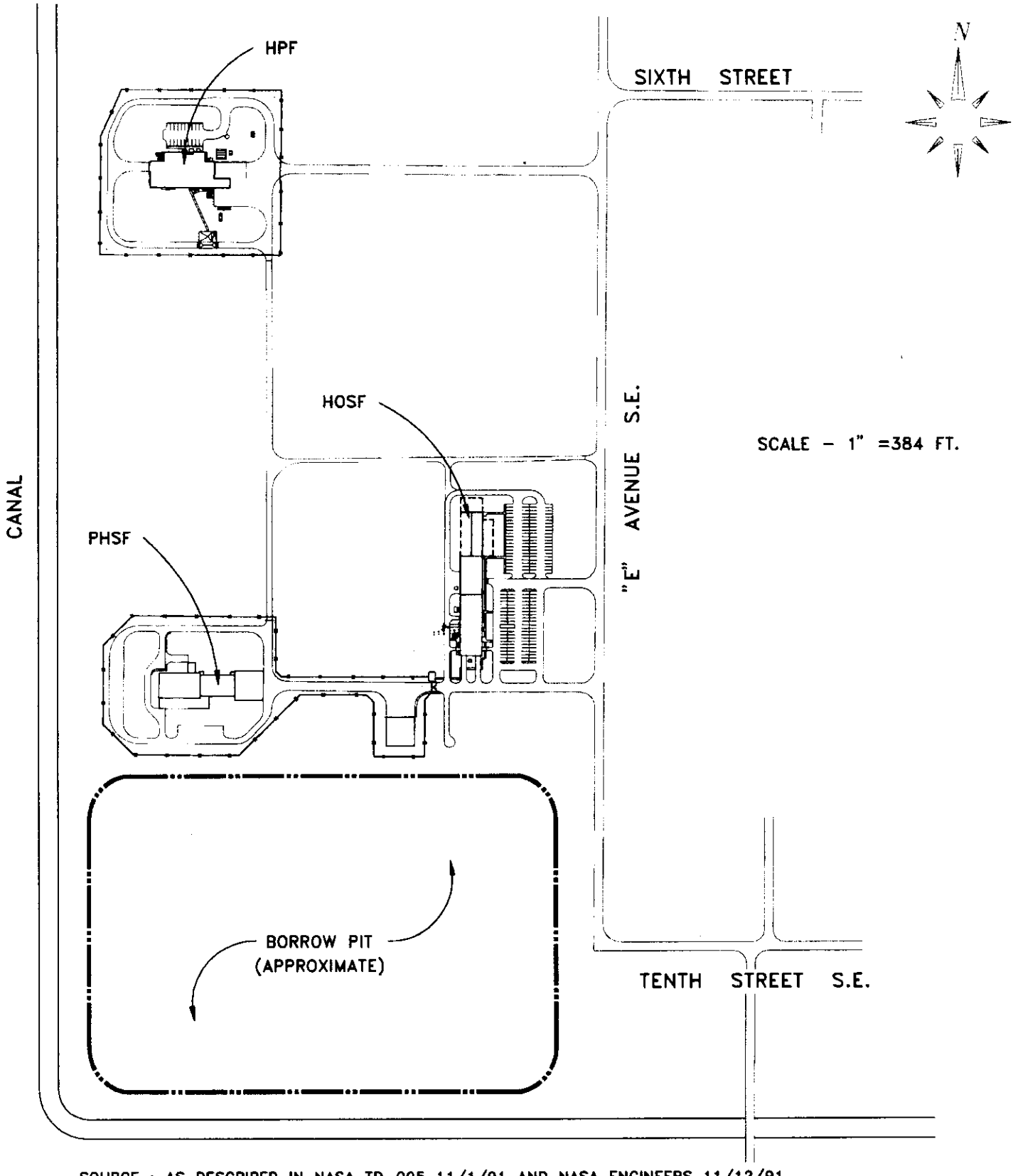
Temporary generation of noise will result from machinery operation and added vehicular traffic. Such short-term and intermittent increases in the noise level would be insignificant relative to other noise levels produced on a daily basis at KSC. Thus, they will not produce an environmental impact.

No historical or archaeological resources have been determined to exist at the proposed site. This determination is based on the review of the 1986 ERD, the 1991 Draft KSC Environmental Resource Document (ERD), and an archaeological survey conducted in July, 1990, near this location. The 1990 survey included digging 9 test pits south of the PHSF, the results of which were negative.

Conclusion

The environmental impact of the borrow pit would include the loss of approximately 11 hectares of relatively undisturbed habitat including 0.38 hectares of wetlands, and a small amount of marginal and isolated gopher tortoise habitat. There were also large areas of the site that contained listed plant species (cinnamon fern, and royal fern). These plant species are listed as commercially exploited by the FDA. Following the procedures discussed above, the impacts to these protected species and other potentially occurring protected species can be minimized. Comparing this site to the possible alternative sites within the Industrial Area, it is clear that environmental impacts will be minimized using this location.

This evaluation was conducted to help fulfill NASA's responsibilities and requirements under the National Environmental Policy Act and 14 CFR 1216 for the preparation of an EA for the PSTF-R proposed action. This evaluation is a part of the PSTF-R EA and is to be appended to that document.



SOURCE : AS DESCRIBED IN NASA TD-005 11/1/91 AND NASA ENGINEERS 11/12/91

FIGURE A-1

LAW ENVIRONMENTAL INC.

SITE CONFIGURATION FOR PROPOSED BORROW PIT

JOB No. 57-1726

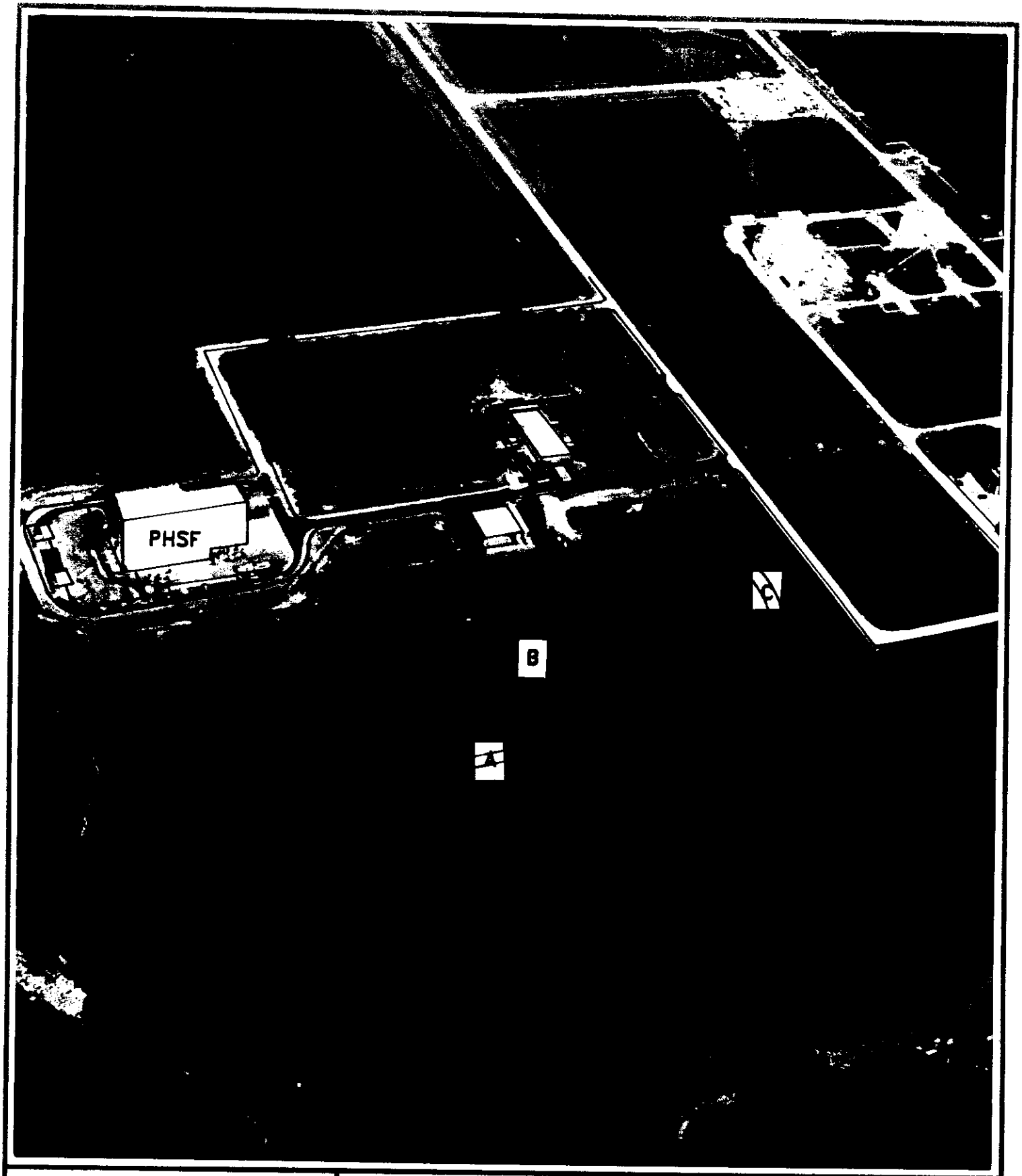


FIGURE A-2

LAW ENVIRONMENTAL INC.

WETLAND LOCATIONS FOR PROPOSED BORROW PIT SITE

JOB No. 57-1726

APPENDIX F
Biological Assessment for the New Industrial Area Borrow Pit on John F. Kennedy Space Center

BIOLOGICAL ASSESSMENT
FOR THE
NEW INDUSTRIAL AREA BORROW PIT
ON
JOHN F. KENNEDY SPACE CENTER

Prepared for:
The Biomedical Operations & Research Office

Prepared by:
The Bionetics Corporation

1. INTRODUCTION

Biological Assessments (BA) are required from NASA by the Endangered Species Office (ESO) of the United States Fish and Wildlife Service (USFWS) to evaluate the potential for adverse impacts to federally listed threatened and endangered species resulting from proposed construction activities. This BA has been prepared to evaluate the potential impacts which may result from construction of a borrow pit at John F. Kennedy Space Center (KSC). The proposed borrow pit is located in an area which may impact the habitat of two federally listed species: the Eastern Indigo Snake, Drymarchon corais couperi, and the Florida Scrub Jay, Aphelocoma coerulescens coerulescens. Both species are listed as threatened by the USFWS under the Endangered Species Act (ESA) of 1973.

2. DESCRIPTION OF PROPOSED PROJECT

The project design includes approximately 26 acres of clearing for a borrow pit. The proposed site is located in the KSC hypergolic payload test area at the south end of E avenue (Figure 1). The borrow pit will be positioned south of the existing facility and north of Buck Creek Canal adjacent to the existing borrow pits (Figure 2).

3. BIOLOGICAL ASSESSMENT

1. Laboratory Analysis

Initial habitat evaluations were conducted using aerial infrared imagery and the Geographic Information System (GIS) vegetation map. Interpretation of the aerial imagery indicated the presence of possible scrub habitat surrounded by dense pine stands, a hardwood hammock and operational facilities. GIS analysis of the vegetation map shows the majority of the proposed site (greater than 80%) mapped as pine flatwoods with hardwood hammock and swamp in the western portion of the site.

2. Field Surveys

Field surveys were conducted on 6 December and 12 December 1991. Observers walked through the interior of the site, around the periphery and along the existing borrow pit roads. Scrub Jay alarm and territory calls were made by the observers. A search was conducted for signs of Scrub Jay nests, Gopher Tortoise burrows and other indicators of Indigo Snake habitat. Observations of any other wildlife species in the area were noted.

3. Field Survey Results

A vegetation map was produced by combining aerial imagery and information gathered from the field survey and GIS vegetation map (Figure 3). Potential Scrub Jay habitat occurs in the north-central portion of the site. Although surrounded by tall, unburned vegetation, this central area is at near-optimal height dominated by scrub oaks mixed with palmetto and lyonia, sparse pine cover and about 5% open space which occurs mainly around fallen pines. Additional suitable habitat for Scrub Jays occurs along the ruderal edge on the northern perimeter of the site.

One Scrub Jay nest was found on the northern perimeter of scrub. The nest was estimated to be three years old. No Scrub Jays responded to observers' calls and no Scrub Jays were seen within the site or immediately surrounding the site. Six active and 3 inactive Gopher Tortoise burrows were seen.

4. Impacts

There are an estimated 10 acres of potential Scrub Jay habitat on the proposed site; however, this habitat is a fragment which is isolated from other potential habitat by significant boundaries. Studies from other areas of KSC (Breininger et al. 1991) have shown that hammocks are boundaries between territories and may be a hindrance to dispersal and occupation. Similarly, dense pine forests, wide expanses of human development and large bodies of water are not used by Scrub Jays and are infrequently crossed by Jays. The closest suitable habitat which is known to support Scrub Jays is approximately 0.4 mi. to the west of the fragment. A Scrub Jay population center exists 0.75 mi. west of the fragment. The average dispersal distance for Scrub Jays at Archbold Biological Station in south central Florida is approximately 0.2 mi. for males and 0.6 mi. for females. These dispersal distances are probably comparable to those on KSC (Breininger pers. comm.). The patch of habitat isolated on the site is beyond average dispersal distances but within potential dispersal capability. However, because it is surrounded by unsuitable habitats that act as barriers, it is unlikely that Scrub Jays use this site with any regularity. The old nest found at the site indicates use by Scrub Jays. The age and placement of the nest suggest that the area was structurally different three years ago and is currently not optimal for nesting. This structural change has resulted from a fire suppression policy in the industrial area which has allowed the overgrowth of pines and unsuitable vegetation around the site. The construction area can not be considered Scrub Jay habitat at this time and no impacts can be expected.

Indigo Snakes use a wide variety of habitats including oak scrub, hammocks and marshes (Kehl et al. 1991). Based on

studies elsewhere on KSC, many habitat features observed on the site are suitable for Indigos, these include: oak scrub, Gopher Tortoise burrows, hardwood hammocks, edges of borrow pits, marshes, ditches, debris piles covered with grapevine, and pine flatwoods. Indigo Snakes occupy large home ranges (300 ac. for males and 76 ac. for females) and they are particularly susceptible to road mortality. These two factors limit where an Indigo population can be sustained because there are few large areas where suitable habitat is not transected by roads. Indigo Snakes need large expanses of land comprised of mixed habitats with low occurrence of human interference. The proposed site in combination with areas to the south and west meets these requirements. It is likely that 1-3 Indigos use the proposed site. Only one male is likely to occupy the site because male home ranges rarely overlap. One or two females could occupy the site depending on the placement of their home ranges; but, because of the site's location it is probable that only one female uses the area. Indigos avoid open water habitats (Kehl et al. 1991) but will use edges of lagoons and ponds, particularly areas which are maintained as marshes and wetland vegetation. The proposed borrow pit may provide some habitat for Indigos around the edge; however, because the sides do not have a gradual slope and marshes will not be maintained around the borrow pit, most (>90%) of the possible Indigo habitat will be lost. The impact predicted for Indigos is 23.4 ac. or 90% of the 26 ac. of construction. This acreage represents 8% of a male's home range and 31% of a female's home range.

5. Mitigation

This site represents a large tract of suitable Indigo Snake habitat; therefore, mitigation may be required. The site does not contain suitable Scrub Jay habitat and no Scrub Jay mitigation should be needed for this construction.

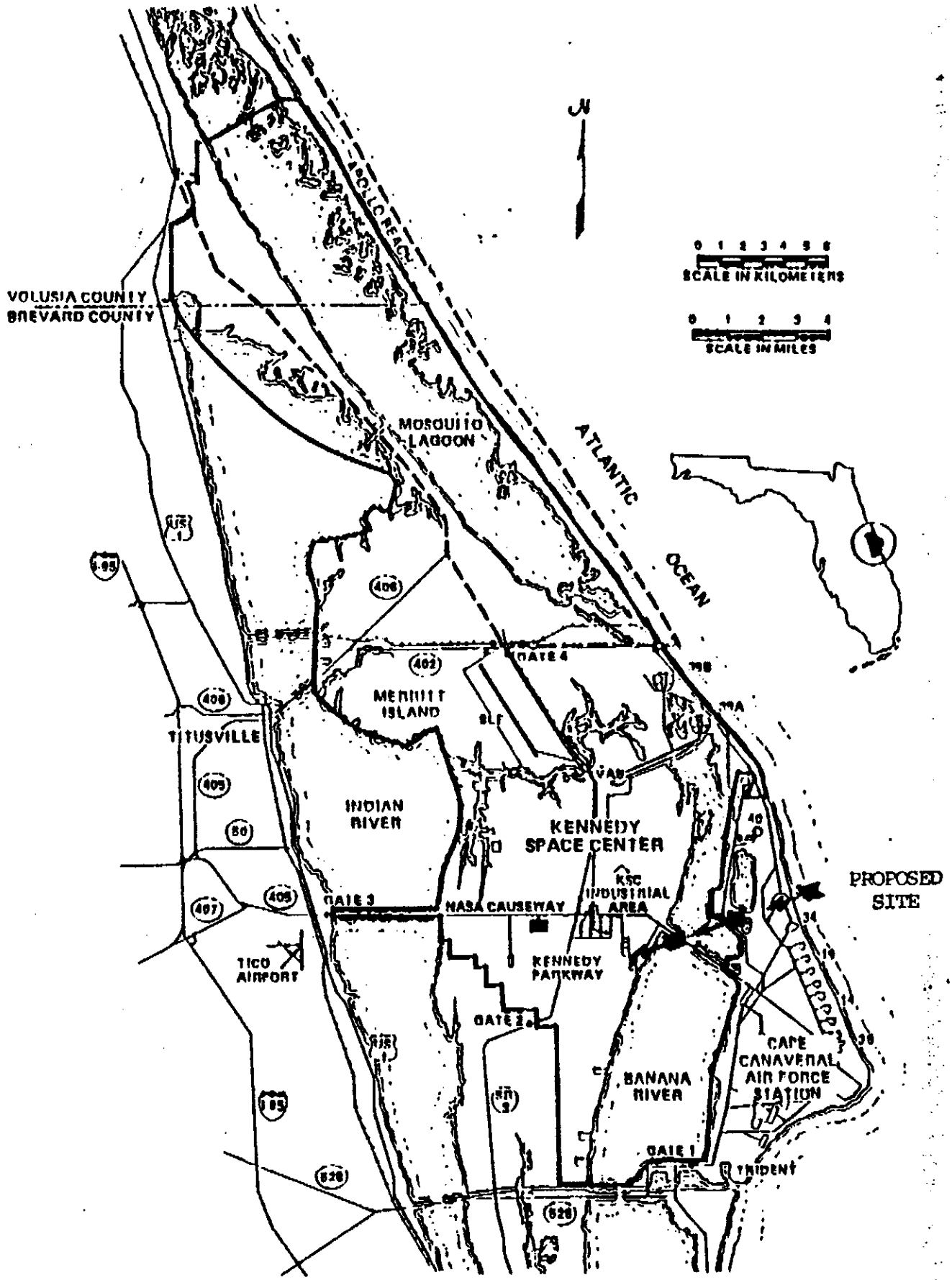


Figure 1. LOCATION OF PROPOSED BORROW PIT IN THE INDUSTRIAL AREA OF JOHN F. KENNEDY SPACE CENTER.

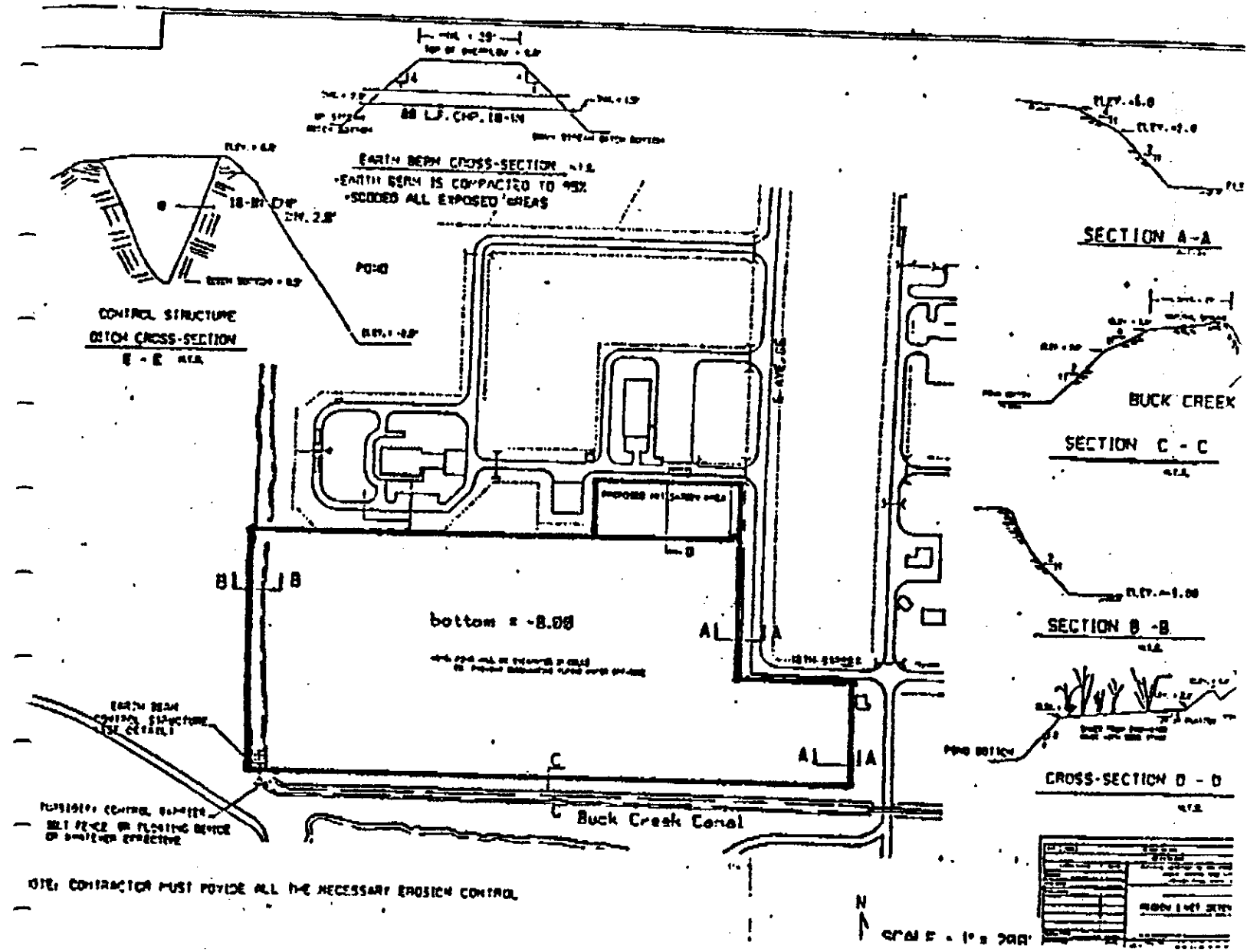
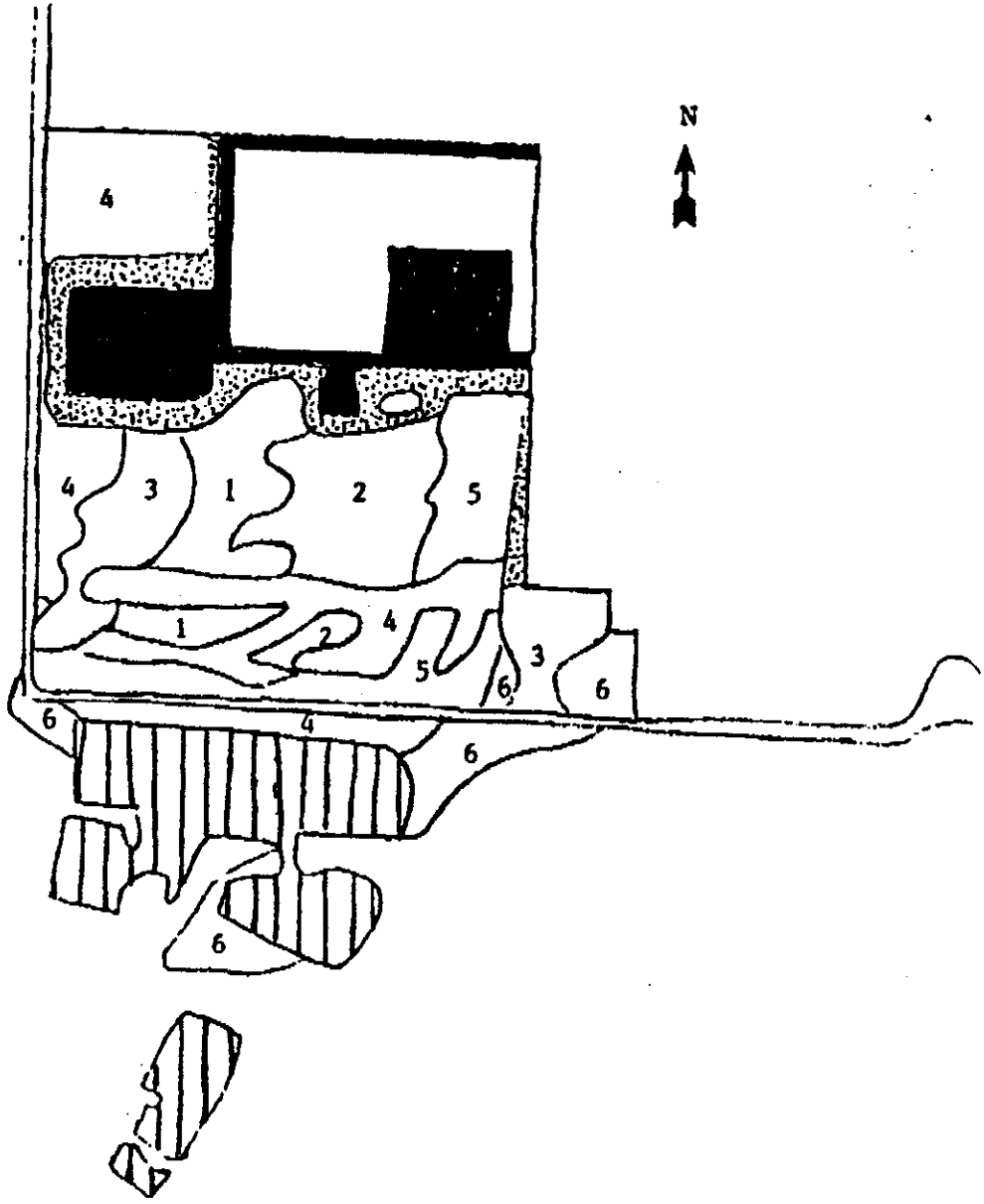


Figure 2. LOCATION OF PROPOSED BORROW PIT



FACILITIES & ROADS

EXISTING BORROW PITS

MOWED GRASS

1 OAK SCRUB
2 PINE FLATWOODS (OPEN CANOPY)
3 HARDWOOD HAMMOCK
4 PINE (CLOSED CANOPY)
5 MIXED DISTURBED VEGETATION WITH GRAPEVINE
6 MARSH & SWAMP

Figure 3. HABITAT MAP OF PROPOSED BORROW PIT SITE.

LITERATURE CITED

Breininger, D.R., M.J. Provancha, and R.B. Smith. 1991. Mapping Florida Scrub Jay Habitat for Purposes of Land-Use Management. Photogrammetric Engineering & Remote Sensing. 57:11 1467-1474.

Kehl, M.J., R.B Smith, and D.R. Breininger. 1991. Radio Telemetry Studies of the Eastern Indigo Snake (Drymarchon corais couperi). American Society of Ichthyologists and Herpetologists. (Abstract).